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A Corpus Study of Sakha (Yakut) Converbs: A Case of *Baran*

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1 Introduction

Sakha (Yakut) is a Turkic language spoken in the Republic of Sakha of the Russian Federation. There are currently around 300,000 speakers of this language. Sakha is very different from other Turkic languages due to independent grammatical changes and extensive lexical borrowings from the neighboring languages, such as Mongolic, Tungusic, and Slavic.

Typologically Sakha is a head-final, suffixing language with a fairly rich case system and basic SOV word order. The language is characterized by rich verbal morphology and the extensive use of non-finite verbs.

The main goal of this paper is to present some results of a corpus study of different types of Sakha converbs with respect to their morphological, semantic, and syntactic properties. There is previous descriptive work, for example Korkina (1985), on Sakha converbs. The current study differs from this work in being based on the corpus study of Sakha converbs. It is based on a corpus of youth newspaper articles of recent publication, which allows us to see the use of converbs in a completely different genre from that of literary works (Korkina, 1985) and, more importantly, its representation in the language of the contemporary youth. Furthermore, this research explores certain linguistic aspects of the Sakha converbs that have not been previously studied. Specifically, the realization of converbs in chaining constructions as "narrative converbs" (V. Nedjalkov, 1995) or "medial verbs" (Haspelmath, 1995).

In this paper all of the examples are sentences from the Sakha corpus.

2 Definition of Converb

The term *converb* was first coined by Gustaf John Ramstedt, the Finnish Altaicist, in 1903; and later was used extensively by many other Altaicists (Haspelmath, 1995). The definition of the term has long been discussed and disputed in the linguistics literature, leading to the coexistence of different definitions. According to Haspelmath (1995), a converb is a non-finite verb form which mainly indicates adverbial subordination. In other words, converbs are verbal adverbs. A similar idea is elaborated by I. Nedjalkov (1998), who defines a converb as a non-finite verb form that cannot act as the predicate of a simple nonelliptical declarative sentence on its own. For Haspelmath (1995) as well as for I. Nedjalkov (1998) nonfiniteness is an important feature that narrows down the range of verb types the definition might otherwise cover.

In this paper I follow the definitions of a converb given by Haspelmath (1995) and I. Nedjalkov (1998).

3 Types of converbs

Sakha has eight types of converbs, three of which are inherently negative (Korkina, 1985). In this section I will discuss briefly all the types of converbs outlining their forms and their semantic realization. However, the corpus study that forms the basis of this work focuses on only five classes of converbs (i.e. *-A/I:, -(A)n, -BAk:A, -A:t*, and *-A:rI*[1]), which I therefore discuss in greater detail.

[1] Following Stachowski & Menz (1998), I indicate vowels of converb suffixes with upper case since their forms change obeying phonological rules of vowel harmony.

***-A/I:* converb:** This class of converbs is marked with an *-A* suffix that occurs after consonants word finally, and changes into *-I:* under certain phonological conditions (Stachowski & Menz, 1998). Converbs in this class require an auxiliary or non-auxiliary verb to appear immediately after them. When an auxiliary verb follows an *-A/I:* converb, it denotes imperfectivity of an event described by the converb. But when a non-auxiliary verb follows, it describes either a simultaneous or a purposive action. When a converb is followed by a stative non-auxiliary verb it conveys a simultaneous action, but when it is followed by a non-stative non-auxiliary verb it describes a purposive action.

***-(A)n* converb:** Another converb that results in an actional modification is a converb formed with the suffix *-(A)n*. Krueger (1962, p.139) describes it as a converb that "denotes actions or sets of actions in which the first is accomplished before the second, or as a necessary prelude to it".

***-mInA* converb:** The *-mInA* suffix, which is inherently negative, is employed to produce the negative forms of the *-(A)n* and rarely the *-A/I:* converbs (Korkina, 1985, p.51). If a stem of a verb ends with a consonant, a connective appears before this suffix (Krueger, 1962, p.139).

***-BAk:A* converb:** Another type of converb which is inherently negative (specifically, 'without doing something') is the *-BAk:A* converb. Like the *-mInA* converb, it is used to negate the *-(A)n* converb, as well as quite infrequently the *-A/I:* converb. Korkina (1985, p.66) suggests that the *-mInA* converb is starting to be replaced by the more frequently used *-BAk:A* converb.

***-A:rI* converb:** Sakha also has a converb that indicates the purpose of an action. Krueger (1962) denotes it as the purposive converb. It is formed with the suffix *-A:rI*.

***-mA:rI* converb:** The negative form of the *-A:rI* converb is formed with the suffix *-mA:rI* (Krueger, 1962, p.141).

***-A:t* converb:** This converb, with a meaning 'as soon as' (Stachowski & Menz, 1998, p.427), is believed to be borrowed from Mongolian (Krueger, 1962, p.141; Korkina, 1985). It indicates an action that takes place immediately prior to the action denoted by the main verb. Following Pakendorf (2007, p.273), I will denote it as a converb of immediate-precedence.

***-BIc:A* converb:** This converb is formed with the suffix *-Bic:A* and indicates causality (Stachowski & Menz, 1998).

Table 1 gives an overview of all eight types of the Sakha converbs with respect to the function they fulfill.

Table 1 Converbs in Sakha

Converb Type	Description	Gloss
-A/I:	simultaneity	CVSIM
-(A)n	anteriority	CVANT
-mInA	negative simultaneity/anteriority	NEG.CVSIM/CVANT
-BAk:A	negative simultaneity/anteriority	NEG.CVSIM/CVANT
-A:rI	purpose	CVPURP
-mA:rI	negative purpose	NEG.PURP
-A:t	immediate-precedence	CVIMM
-BIc:A	causality	CVCAUS

4 Corpus study

A corpus of Sakha with a total of 319,823 words was created based on the website *ykt.ru/edersaas*[2]. This website is an online archive of youth newspaper publications "Eder saas" ("Youth") covering the period of 1998 - 2001[3].

The pages of the aforementioned website were automatically retrieved and their content was extracted using Perl. The bulk of the unorganized information was analyzed for word occurrences.

[2] http://www.ykt.ru/edersaas (04/2007 - 05/2007)

[3] The website unfortunately does not include the publications of recent years, but the newspaper is still published nowadays in Yakutia.

As mentioned in Section 3, in this study I focused on five types of converbs, namely the *-A/I:, -(A)n, -BAk:A, -A:t,* and *-A:rI* converbs. In order to analyze the distribution and realization of these types of converbs in sentences, representative verbs for each converb type (e.g. the *baran* 'go' converb for the *-(A)n* type of converb) were chosen from the corpus based on the frequencies of occurrence and automatically retrieved in the sentential context. Hence, the most frequently occurring converb representing its type was retrieved first.

The sentences with the frequently occurring converbs were sorted and stored in a database, in order to be coded for the linguistic features that I was interested in. In cases where the most frequently occurring representative converb appeared in less than hundred sentences, additional less frequently occurring representative converbs were retrieved from the corpus in decreasing order of frequency. This process was repeated until a substantial set of nearly a hundred converbs representing each type of converb was created. Table 2 provides a breakdown of the representative converbs for each type of a converb.

Table 2 Number of sentences representing each type of a converb

Type of converb	Representative		Total # of sentences
-A/I:	*uleli:* 'to work'		198
-(A)n	*baran* 'go'		926
-BAk:A	*buolbak:a* 'without being'		127
-A:t	*ki:re:t* 'as soon as having entered'	20	102 (total)
	tuhe:t 'as soon as having fallen'	16	
	ti:je:t 'as soon as having reached'	16	
	butere:t 'as soon as having finished'	14	
	kele:t 'as soon as having come'	11	
	buola:t 'as soon as having become'	11	
	takhsa:t 'as soon as having gone out'	8	
	yla:t 'as soon as having taken'	6	
-A:rI	*buola:ry* `in order to become'	26	104 (total)
	bile:ri `in order to know'	24	
	bara:ry `in order to go'	19	
	yla:ry `in order to take'	12	
	ki:re:ri `in order to enter'	9	
	takhsa:ry `in order to go out'	8	
	kere:ry `in order to see'	6	
Total			1457

The sentences were manually coded for the following features: number of converbs per clause, meaning, subject sharing (*same-subject converb* and *different-subject converb*), person-marking (*person-marked* and *unmarked*), morphological form (*single form* and *reduplicated form*) (for the *-A/I:* converbs), and postposition (*with postposition* and *without postposition*) (for the *-A:t* converbs).

In the following sections I will give a general overview of the converb occurrences per clauses and for the other remaining features I will discuss the most frequently occurring representative converb of the *-(A)n* type *baran* 'go'.

5 Narrative Converbs

Turkic languages are known to allow sentences in which there are more than three converbs occurring one after another in a clause as opposed to some other languages with converbs, such as Slavic and Finno-Ugric languages, which do not allow this (V. Nedjalkov, 1995). In order to see whether the same pattern is found in Sakha and to have a general picture of how many converbs can cooccur per clause, I analyzed the number of converb occurrences per clause in the collected dataset. In this analysis, I use a term *clause* as a portion of a sentence that ends with a finite main verb. For reasons of clarity, I will employ the term *finite clause* when referring to such a structure.

The results of the analysis can be seen on Table 3. Out of a total 1660 finite clauses[4] with converbs, 28.5% of finite clauses appear with one converb, and 71.5% of them occur with two or more converbs, or to interpret it differently: 61.4% of finite clauses have one or two converbs and 38.6% have three or more converbs per finite clause. These results show that finite clauses with three or more clauses are quite frequent.

Table 3 Frequencies of converb occurrence per clause

Number of Converbs (per clause)	Freq.	%
1	473	28.5
2	546	32.9
3	327	19.7
4	170	10.2
5	69	4.2
6	46	2.7
7	21	1.3
8	4	0.2
9	2	0.1
15	1	0.1
23	1	0.1
Total	1660	100

The sentence (1) has eight converbs, seven of which show the events in succession in one finite clause. All of them are the contextual converbs of *-(A)n*, as well as *-A:t* types. These converbs fall under the category of narrative converbs, since they "can express three or more completed actions in succession that advance the narration" (V. Nedjalkov, 1995).

Haspelmath (1995), on the other hand, assigns a different term to the same concept. He views these converbs as medial verbs that do not fall under the typical categorization of converbs, but rather as a type of a larger continuum defined relative to the category *converb*.

(1) *By:bar akhsyn ara:s duohunaska anj:yha:c:ylar yc:aty ara:sta:n* ***albyn:a:n***
elections.NOM every various position.DAT candidates.3pl.NOM youth.ACC differently trick.CVANT
kim diskoteka ***terijen****, kim pi:be, kim zhvacka* ***tuneten***
who dance.party.NOM organize.CVANT who beer.NOM who gum.NOM distribute.CVANT
bejelerin syal:arygar ***tuhanan baran****,* ***talyl:a:t***
self.POSS.3pl.ACC goal.POSS.3pl.DAT use.CVANT after get.elected.CVIMM
eren:eri:lerin ***umnan*** *kebihel:er* ***dien*** *etilin:e.*
promise.POSS.3pl.ACC forget.CVANT leave.PRS.3pl say.CVANT be.told.PRS.3sg
'It was pointed out that in every election the candidates for different positions tend to trick youth by organizing parties, giving away beer and distributing gums. After using them for their own purposes as soon as they get elected they forget about their promises.'

6 Semantic properties of Sakha Converbs

Table 4 shows a distribution of different meanings of the *-(A)n* converb form which I will focus on here, *baran* 'go.CV'. This converb is a particularly interesting case both from the perspective of its frequency of occurrence and the semantics it can convey. When preceded by another *-(A)n* converb, *baran* has the meaning 'after', and thus it acts as a grammaticalized postposition. In our corpus, this is the most frequent use of *baran*, found in 64.7% of the examined sentences. This obviously should prompt us to question the status of *baran* as a converb; it is now more often realized as a full-fledged postposition than a converb. Although this fact makes 64.7% of cases of *baran* technically not viable for the discussion of the Sakha

[4] Note that some sentences contain multiple finite clauses. The finite clauses without converbs are not taken into account.

converbs it will still be interesting to analyze its features and to see how different they can be from other representative converbs. The sentence in (2) illustrates the use of the converb *baran* with a meaning 'after'.

Table 4 Frequencies of different meanings of the *-(A)n* converb *baran*

Meaning	Freq.	%
'after'	599	64.7
'however'	113	12.2
'although'	16	1.7
'additionally'	1	0.1
'go'	197	21.3
Total	926	100

However, one still finds many instances of *baran* being used with its lexical meaning 'go', as in (3). It still occurs in 21.3% of cases. Unlike *baran* 'after', which is always preceded by another converb in its postpositional use, the true converbal use of *baran* stands alone. Although the meaning of the verb stem *bar-* itself is 'go' *baran* used as a converb seems to have weaker position compared to the more frequent postpositional use of the word.

When postpositional use of *baran* is preceded by the demonstrative *ol* 'that' and the *-(A)n* converb *gynan* 'do', it forms a set phrase that functions as a connective 'however'. The occurrence of *baran* 'after' as a part of a connective *ol gynan baran* 'however' (that do.CVANT after."CVANT") appears about half as much as *baran* with a meaning 'go', exemplified in (4). In cases when *baran* 'after' is preceded by the converb *gynan* 'do' alone without the demonstrative *ol* 'that', the combined form *gynan baran* conveys a meaning 'although' (5). This meaning is found only in 1.7% of cases. There is only one sentence where *baran* 'after' preceded by the *-(A)n* converb *buolan* 'become' forms a phrase *buolan baran* literally translated as 'after becoming' and conveys a meaning 'additionally, on top of' (6).

(2) *Onton 11 kyla:hy buteren **baran**, kyla:spyt uolat:ara bary kyrala:n*
then 11 class.ACC graduate.CVANT after class.POSS.1pl boy.POSS.3pl.NOM all bit
erginerge sanam:yp:yt.
trade.PRT.DAT decide.PST.1pl
'After graduating from 11th grade, all of the boys of our class decided to do business.'

(3) *Khata iti on:ugar **baran**, djieleriger oloron tyaha-u:ha suokh*
rather that instead go.CVANT home.POSS.3pl.DAT sit.CVANT noise.POSS.3sg NEG
uruoktarygar belemnenie etiler.
lesson.POSS.3pl.DAT prepare.PROSP be.PST.3pl
'Instead they should have gone to their home and prepared their lessons.'

(4) [*Ol gynan **baran***] *mi:gin oloGum man:yk surujarga tierte*
that do after 1sg.ACC life.POSS.1sg like.this write.PRT.DAT send.PST.3sg
diekh:e duu.
say.COND maybe
'However, maybe I should say that my life forced me to write like this.'

(5) *Bil:en turar, uerenerge yarakhan gynan **baran**, prestihe urduk.*
know.CVANT stand.PRT study.PRT.DAT difficult [do after] prestige.POSS.3sg high
'It is known that although it is difficult to study, the prestige is high.'

(6) *Araj byjyl, es:e buolan **baran** sohuc:u ueru:, Djoku:skajga oloror*
suddenly this.year yet [be.CVANT after] unexpectedly joy.NOM Yakutsk.DAT live.PRT
natsionalnaj gimnaziaGa uerener Ulia SergucevaGa tiksibit.
national gymnasium.DAT study.PRT Ulia Sergucheva.DAT get.PST.3sg
'But this year, and on top of everything an unexpected joy, it was given to a student of the Yakutsk National Gymnasium, Ulia Sergucheva.'

7 Subject sharing in Sakha converbs

An important parameter of variation in converbal constructions is whether or not the subject of the converb must be the same as the subject of the finite verb. In most languages the subject of a converb is coreferential with the subject of a finite verb (Haspelmath, 1995). But there are also cases where converbs have different subjects from the finite verbs they are associated with. Three types of converbs can be distinguished based on the coreferentiality of a subject: 1) same-subject converbs; 2) different-subject converbs; 3) varying-subject converbs (I. Nedjalkov, 1998; V. Nedjalkov, 1995).

As is generally the case in converbal systems of other Turkic languages, Sakha does not have a different subject converbs (I. Nedjalkov, 1998). This is not surprising in light of the fact that different subject converbs are considered to be the typologically rarest type of converb in the languages of the world (I. Nedjalkov, 1998).

With respect to the *-(A)n* converb, the subject of the converb is coreferential with the subject of the finite verb in 77% of cases (Table 5). This is against 7% of sentences where the two verbs have different subjects. The sentences with a converb that has a meaning 'however', 'although', and 'additionally' were not coded for subject sharing (See Section 6). In 2% of cases converbs occur in elliptical sentences not containing a finite verb. In all of the cases a converb *baran* has higher probability of occurring with a coreferential subject, but there are still cases where it occurs with a different subject. Thus, *baran* as a representative converb shows that the *-(A)n* type of converb is a varying-subject converb that occurs mostly with coreferential rather than non-coreferential subjects.

Table 5 Subject sharing in the *-(A)n* converbs

Subject Sharing	Freq.	%
coreferential subject	716	77
non-coreferential subject	66	7
N/A	130	14
ellipsis	14	2
Total	926	100

Table 6 shows the distribution of the meaning of the converb *baran* with respect to its subject. *Baran* with a meaning 'go' occurs with a different subject more often than *baran* with a meaning 'after'.

Table 6 Cooccurrence of meaning and subject sharing in *baran*

Meaning	Subject sharing	Freq.	%
'after'	coreferential subject	553	92
	non-coreferential subject	34	6
	ellipsis	12	2
Total		599	100
'go'	coreferential subject	164	83
	non-coreferential subject	31	16
	ellipsis	2	1
Total		197	100
'however'	N/A	113	100
'although'	N/A	16	100
'additionally'	N/A	1	100

Example (2) gives a case where the subject of the converb is coreferential with the subject of the finite verb. The subject is unspecified except for the fact that it is third plural, which can be determined from marking on the finite verb. In sentence (7), however, the subject of the converb *oskuola syba:jata* 'school's building base' is not the same as the subject of the main verb - *ule* 'work'.

(7) *Oskuola syba:jata tuhen* ***baran****, er kemne ule barbak:a turbut.*
school base.POSS.3sg fall.CVANT after long time.DAT work.NOM go.NEG.CVSIM stand.PST.3sg
'After the school's building base was laid, for a long period of time no work has been done.'

8 Person-Marking in Sakha converbs

The optional occurrence of person-markers is a characteristic feature of the Sakha converbs, setting them apart from converbs found in other Turkic languages (Pakendorf, 2007). Although it has been suggested that this feature was borrowed from Evenki, a neighboring language that exhibits the same phenomenon, Pakendorf (2007) disproves this hypothesis and claims that the person-marking in the Sakha converbs is an independent development.

All the Sakha converbs, except the *-A:t* converb, optionally take predicative person-markers, one of two classes of agreement markers, that show an agreement with the subject (Korkina, 1985; Pakendorf, 2007). The *-A:t* converb does not follow the general pattern in person-marking; it instead takes possessive-accusative suffixes that mark a subject agreement in all persons and numbers.

The full paradigm of person-marking for the *-(A)n* converb represented by *baran* is given in Table 7.

Table 7 Person-marking suffixes for the *-(A)n* converb

	Singular	Plural
1	*baram-myn*	*baram-myt*
2	*baran-nyn*	*baran-nyt*
3	*baran*	*baran-nar*

The results of analyzing person-marked *-(A)n* converbs are striking (Table 8). Only 1.4% of the surveyed converbs occurred with a person-marker. This pattern was first noticed by Korkina (1985). She suggested, though as she noted without any statistical evidence, that the converb *baran* 'go' is used less with a person-marker. This analysis shows that this is indeed the case. An example of a person-marked converb is given below in (8).

Table 8 Frequencies of person-marked and unmarked *baran* converbs

Marker	Freq.	%
no person-marker	913	98.6
with person-marker	13	1.4
Total	926	100

(8) *Man:a uerene* *ki:ren* ***baran:yn*** *talbyt* *ideGin,*
here study.CVSIM enter.CVANT after.2sg chosen profession.POSS.2sg.ACC
uerekh:in *tehe sebule:tin?*
study.POSS.2sg.ACC how like.PRS.2sg
'After entering to study here, how do you like your chosen profession and studies?'

Of the 13 cases, 11 fall into the 'after' class and 2 into the 'go' class. As the corpus shows *baran* used as a connective does not occur with a person-marker (Table 9).

Table 9 Converb meaning and person marking in *baran* converbs

Meaning	Marker	Freq.	%
'after'	with person-marker	11	85
'go'	with person-marker	2	15
Total		13	100

In 77% of the cases (Table 10) where the converb *baran* occurs with a person-marker it has a coreferential subject. This leads to a redundancy in subject agreement. One might expect to see a person-marker on a converb when it has a subject that is different from the subject of a main verb. However, this is the case with only one of the converb types. The *-A:t* converb type does require person-marking in switch-reference sentences. In an attempt to explain this phenomenon, Pakendorf (2007) points out that person-markers are used to emphasize the main actant of the sentence, as well as to facilitate reference tracking in discourse. More sentences with person-marked converbs need to be analyzed to see whether this is really the case.

Table 10 Cooccurrence of subject sharing with a person-marker in *baran* converbs

Subject Sharing	Marker	Freq.	%
coreferential subject	with person-marker	10	77
non-coreferential subject	with person-marker	1	8
ellipsis	with person-marker	2	15
Total		13	100

9 Conclusion

The high count of the *-(A)n* and *-A:t* converbs per clause shows that they are used in clause-chaining constructions with a primary function to advance the narration. These specific features allow me to classify them as *narrative converbs* following V. Nedjalkov's (1995) definition, or as *medial verbs* following Haspelmath's (1995).

The most frequently occurring representative of the *-(A)n* type *baran* conveys different meanings. *Baran* is employed as a content word as well as a function word. Within the corpus, *baran* most frequently functions as a grammaticalized postposition meaning 'after' when preceded by a converb of the same type. Less frequently when standing alone *baran* occurs with a meaning 'go'. Rarely does it also function as part of a connective meaning 'however'. This sense is realized in a set phrase where *baran* is always preceded by the phrase *ol gynan* (literally, 'that do.CVANT'). Finally there are few sentences in the corpus where *baran* conveys a meaning 'although' when preceded by *gynan* 'do' alone and 'additionally' when preceded by *buolan* 'become'.

The analysis of the subject sharing properties of *baran* suggests that *baran* as a representative of the *-(A)n* converb type is a varying-subject converb that occurs mostly with coreferential subjects rather than non-coreferential subjects.

The infrequent occurrence of the person-marked *baran* converbs suggests that there is an increasing tendency to use converbs without person-markers. These findings support earlier observations by Korkina (1985).

Abbreviations

ACC - accusative, COND – conditional, CVANT - converb of anteriority, CVIMM - converb of immediate precedence, CVSIM - converb of simultaneity, DAT - dative, NEG - negative, NOM - nominative, pl - plural, POSS - possessive, PROSP – prospective, PRS - present, PRT - participle, PST – past, sg - singular

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Agnostic Movement in Malagasy Focused Predicates

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1 Introduction to the problem

In this paper I argue essentially two different points, one apparent and the other implicit. The first is empirical in nature and concerns the reconciliation of aberrant data with a proposed universal by means of some novel data. The implicit argument being made here is of theoretical importance and concerns the utility and potential existence of a currently under-investigated motivation for syntactic constituent movement. Namely, the fact that so-called "agnostic movement"[1] can neatly account for the data presented here suggests that it may play a important role in the narrow syntax motivation for movement in general. This should be kept in mind as the greater theoretical argument upon which the empirical argument rests.

The crux of the issue here is the discrepancy of a proposed universal and data from Malagasy, an Austronesian language spoken primarily in Madagascar. Rackowski and Travis (2000) (R&T) note that the overt order of some adverbs in canonical Malagasy sentences sometimes runs counter to Cinque's (1999) order. Cinque argues for a universal ordering of adverbs that, prior to any movement operations, appear as in (1) below.

(1) Cinquean order (1999)

1 2 3 **4** **5** 6 7
(speech act) > generally > neg > **already** > **still** > (at all) > anymore >
8 9 ***10***
always> completely > ***well***

Adverb order in Malagasy has been shown not to be consistent with that which would be predicted under Cinque's typography. Although pre-verbal adverbs match with the proposed universal order, post-verbal adverbs are found to be in a near-perfect mirror order. The summarized results of R&T's' work is found below in (2). Note that the emboldened pre-varbal adverbs in (1), 'already' and 'still', are said to come fourth and fifth respectively and that this is what is found in the Malagasy order proposed by R&T with the emboldened 'efa' and 'mbol'. Contrast the emboldened and italicized adverbs 'always' and 'well', which are predicted by Cinque to come eighth and tenth. In Malagasy these adverbs (the emboldened and italicized 'foana' and 'tsara') appear post-verbally and in the mirrored order.

(2) Malagasy order

2 3 **4** **5** (3) **10**
na(dia > mateika > tsy > **efa** > **mbol** > tsy > VERB > ***tsara*** >
even > *generally* > neg > ***already*** > ***still*** > neg > VERB > ***well*** >
9 **8** 7 6 1
tanteraka > ***foana*** > intsony > mihitsy > aza > ve
completely >***always*** > *anymore* > *at all* > *though* > speech act

The order in (2) is shown empirically in R&T's data in (3a,b) below. Malagasy declaratives are canonically VOS and the adverbial clusters are found either sentence-initial or after the verb-object complex.

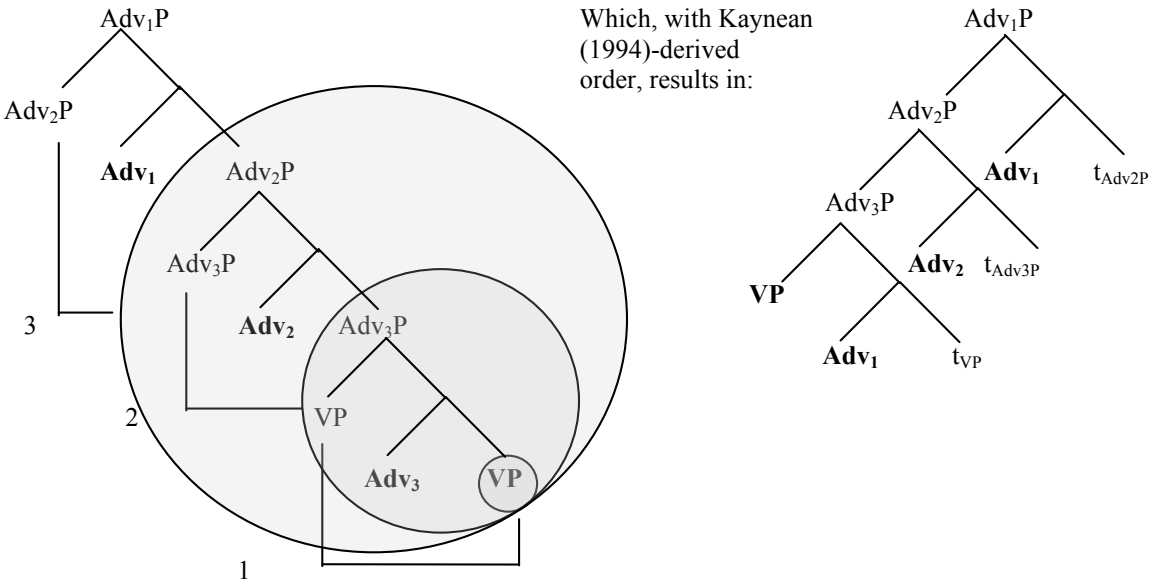
[1] The term in this sense was originally used by Franks and Lavine (2006).

(3) a. **Efa** **mbola** tsy mahay lesona Rakoto no mbola mitabataba
already still NEG PRES.AT.know lesson Rakoto FOC still talkative
"*Not only does Rakoto not know his lessons, but he is talkative also"*
(R&T, 2000:120)

b. Manasa lamba ***tsara foana*** Rakoto
PRES.AT.wash clothes ***well always*** Rakoto
"*Rakoto always washes clothes well"* (R&T, 2000:120)

R&T hypothesize the notion of *intraposition movement* (4) to account for the unexpected post-verbial adverb order. This sort of movement involves the VP moving to the specifier position of AdvP headed by a given adverb. This AdvP in turn moves to the specifier of the suprajacent AdvP and so on. This, While obeying both cyclicity and Huang's (1982) Constraint on Extraction Domain, successfully results in the mirrored adverb order seen in (4b).

(4) a. b.



Although the R&T hypothesis presents a plausible explanation for the roll-up effect, what is left unaccounted for is the motivation for the movement.

2 Motivation found in Agnostic Movement

The concept of agnostic movement has been suggested in various forms by Bošković (2002, and upcoming), Franks & Lavine (2006), and Boeckx (2008). The basic idea is distilled in the hypothesis below.

"If you don't know (locally), you can do everything you can so as to maximize your options)"
(Boeckx, 2008:116)

This is to say that, given an element with an unchecked feature, it should be possible for that feature to move into a position where it could be checked or could continue to move in hopes of being checked. Long distance movement is explained in a more minimal and coherent manner than previous accounts that rely on multiple, intermediate EPPs (see Chomsky, 2001:34-35).

For example, an element with an unvalued question feature (uWH) could continuously agnostically move to the uppermost position of a derivation and be in a sufficiently close position for Agree when the C is finally merged into the derivation. In the generally accepted framework, the element requires some look-

ahead ability (the knowledge that a uWH-checking C will be merged) or ad hoc intermediate EPP features to climb up the derivational ladder. Agnostic movement does not rely on any such invisible or theoretically undesireable (read cumbersome and not minimalist in nature) support.

A more fully fleshed arguement for agnostic movement can be found in Bošković (to appear). Bošković works under the Fox & Pesetsky (2005)-style assumption that phase-internal linear order must not be contradicted. In (5) below, 'A' can freely move out of the completed spell-out domain to the left because it cannot possibly contradict the linear order that way. Letter 'B' however cannot move out to the left because it has already been spelled-out as following 'A'.

(5) $[A\ B\ C]_{\text{spellout domain}}$ OK A $[t_A\ B\ C]$
Not OK *B $[A\ t_B\ C]$

This concept is used by Bošković to explicate agnostic movement, shown schematically in (6) and explicated in his own words below.

(6) $[_{XP}$ ...X.....Y(P)$]$ {XP=phase} $[_{XP}\ Y(P)_i\ [_{XP}$ ...X...$t_i]$
uK uK
(adopted from Bošković, to appear:31)

"The uK of Y, which cannot be checked within XP, is what tells us that Y will need to move. If Y does not move to SpecXP, its uK feature will never get checked. So, uK of Y is what tells us that Y will have to move, and we know that without look-ahead."

(Bošković, to appear:31)

To sum up the nature of agnostic movement presented here, I present the following definition:

(7) Agnostic Movement: Driven by unchecked features to avoid crash, but not into direct checking relations.

3 Agnostic, Focus-driven movement

Given the unbounded and relatively unconstrained nature of agnostic movement, it is a good potential candidate to motivate R&T's intraposition movement. For this to work, there must be an unchecked feature to instigate the desire to move. I suggest that in Malgasy post-verbal adverb order this feature is related to focus. The predicate is not always sentence-initial in Malagasy. Paul (2000) among many others including Law (2005), Paul (2001), and Pearson (2007) present data like that in (8) where an element other than the matrix predicate is sentence-initial.

In (8a) the logical subject is fronted and focused and receives the non-canonical cleft interpretation given below. In (8b), as with all wh-words in Malagasy, 'izai' is fronted and focused.

(8) a. Ny gidro no **mihinana** ny voasary
Det lemur FOC **AT.eat** Det orange
"*It's the lemur who is eating the orange*" (Pearson, 2007:12)

b. Izai no **nividy** ity trondro ity?
who FOC **bought.AT** this fish this
"*Who bought this fish?*" (Law, 2005:195)

It is commonly asserted that the 'no' particle found Malagasy clefts is a focus particle (cf. Law (2005), Paul (2001), Pearson (2007), etc.). Additionally, sentence-initial phrases are interpreted as discourse-related new information, which is focused. That is, in (9a,b) the emboldened words receive a focus interpretation.

(9) a. [**Nohaniko**] ny akondro roa
eat(OT)-1sg Det banana two
"*I ate two bananas"*

b. [**Nihinana akondro roa**] aho
eat(ST) banana two 1sg
"*I ate two bananas"*

(Pearson 1996:123)

I assume that some sort of the Kaynean claim of universal pre-movement SVO word order is true and the sentences in (9) have undergone some sort of movement to result in their overt orders. Sentences of the types found in (8) and (9) taken together suggest that predicate movement is somehow related to focus, and lack of focus corresponds with lack of movement.

In the next section I discuss how these unchecked focus-related features could work within the predicate to archive the roll-up predicted by R&T.

4 Combinatorial Feature Percolation

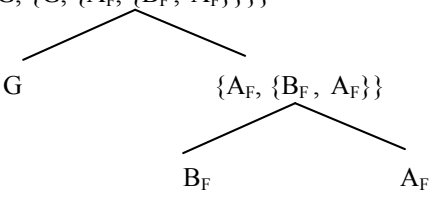
In Bošković's example of agnostic movement the identity of the moving element remains constant, but it seems to continuously grow in intraposition movement.

(10 $[_{VP}VP]$ --> $[_{AdvP3}[_{VP}VP]+Adv_3]$ --> $[_{AdvP2}[_{AdvP3}[_{VP}VP]+Adv_3]+Adv_2]$

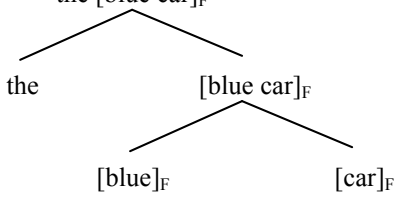
I posit that this is the result of a combinatorial accumulation of multiple uF(ocus) features that project with the label of the head they are associated with. I borrow and alter this idea from Irurtzun (2006), who also (coincidentally) associates this sort of feature projection with focus.

In the trees below, features percolate up the phrase and combine with like of other constituents features to define the new, large constituent created by merge.

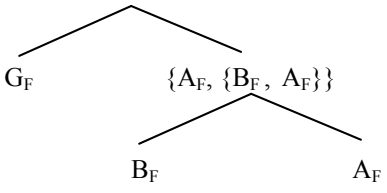
(11) a. $\{G, \{G, \{A_F, \{B_F, A_F\}\}\}\}$



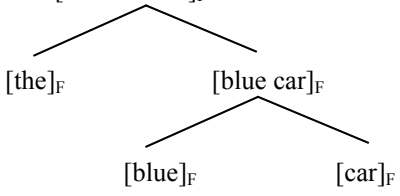
b. the [blue car]$_F$



c. $\{G_F, \{G_F, \{A_F, \{B_F, A_F\}\}\}\}$



d. [the blue car]$_F$



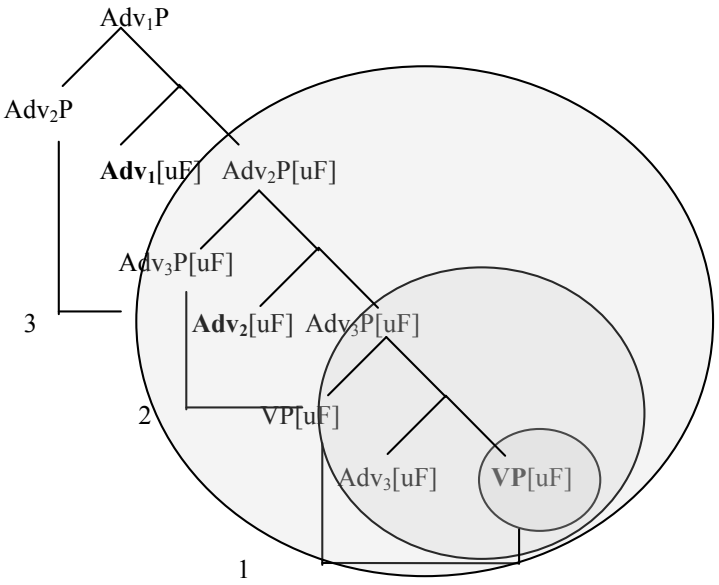
(Irurtzun, 2006:7)

The concept of intrapositon movement seen earlier in (4a,b) can be integrated with this combinatorial feature percolation to create (12) below. Features on heads percolate up to the maximal projection which, when they move, carry the all elements in the phrase along with them.2

I assume here a F(ocus) projection in the left periphery a la Rizzi (1997) that would eventually check the [uF] feature. Here however, reliance on the EPP for movement before the introduction of the F(ocus) projection is unnecessary; the mere existence of the uF(ocus) features is sufficient to drive intermediate movement.

[2] What prevents all agnostic movement from resulting in roll-up word orders would be the variations on which particular elements arrive from the numeration with unchecked features. Canonical Malagasy predicates roll up solely because the entire predicate is focused as opposed to a single element like in (8a,b).

(12)



5 Prediction and Confirmation

It is thus possible to explain the roll-up effects seen in post-verbal adverbials in Malagasy. The overt order of (13a) would be schematically represented as (13b).

(13) a. [Manasa lamba ***tsara foana***] Rakoto
PRES.AT.wash clothes ***well always*** Rakoto
"*Rakoto always washes clothes well"*
(R&T, 2000:120)

b. $[_{AdvP1}[_{AdvP2}[_{VP}$ Manasa lamba] ***tsara*** $t_{VP}]$ ***foana*** $t_{advP2}]$

This also makes the prediction that there should be no focus-driven agnostic movement within and of the predicate when a different phrase receives a focus interpretation. That is, any and all adverbs should appear in front of the verb. This is indeed born out as is seen the novel examples in (14)3. Both of these examples are of the same type as (8b) in that they questions with a fronted and focused wh-word. Schematically, (14b) is shown as (14c).

(14) a. Iza no **tsara atao** filoha àry ?
who FOC **well make.passive** president then?
"*Who would be well made/chosen director?"*

b. Inona no **tsara ataonay**?
What FOC **well make.passive.past**
"*What was done well?"*

c. no $[_{AdvP}$ tsara $[_{VP}$ Ataonay]]

In (14a,b) the wh-words would presumably have the uF(ocus) feature and that would drive their

[3] These data were found on online bulletin board systems still require native speaker validation. Glosses were developed from the sources listed in the following penultimate section.

movement to the top of the tree and the front of the sentence. Given the feature percolation of heads sketched in section 4, the wh-words would bring along only those elements dominated by the head with the unchecked feature.

6 Conclusion

As stated at the outset, this paper achieves two objectives. The empirical clash between Cinque and R&T has been reconciled in a plausible manner. And in doing so, an argument has been made in favor of a new and under-investigated type and motivation for movement: agnostic movement.

On the empirical side, further verification of the non-focused predicate word order must be found before feeling sufficiently comfortable with the reliability of the novel data presented in section 5. The claims made concerning them are however straightforwardly testable and awaits further validation.

On the theoretical side, the concept of agnostic movement is promising in its explanatory power and far preferable in its theoretical plausibility when compared with current norms. What this paper does on that front is provide further evidence of its utility and theoretical promise in hopes of promoting further research concerning it.

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<http://malagasyworld.org/bins/homePage?ol=mg.en.fr.it.de.ww.lt>

Malagasy-French translation website

<http://dico.malagache.free.fr/index.html>

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Sentence (12a) found at: <http://forum.serasera.org/?rub=dinika/message&msgid+m47ff55c7de40>

Sentence (12b) found at: <http://serasera.org/forum/?rub=dinika/message&msgid=m47e086eb633c9>

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Reverse Complex Predicates in Hindi

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1 Introduction

Hindi aspectual complex predicate constructions involve a verb that denotes a situation-type (i.e., the MAIN verb) and a semantically-bleached LIGHT verb, an aspectual functor which semantically modifies the main verb's meaning. The following examples illustrate a single predicate and a complex predicate, respectively.[1]

(1) *Ram* *Leela=se* *lad-aa*
Ram.M Leela.F=Inst fight-Pfv.M.Sg
'Ram fought with Leela.'

(2) *Ram* *Leela=se* *lad* *baith-aa*
Ram.M Leela.F=Inst fight:MV sit-Pfv.M.Sg:LV
'Ram fought with Leela regrettably.'

In both examples, the subject Ram has a fight with Leela; however, the light verb in (2) adds the notion that the fight was an unwilling act. Constructions such as (2), and (3), where the finite light verb follows a non-finite main verb are standard in the language. The order of the main and light verbs can also be reversed, as in (4) where the finite light verb *de* (give) precedes the non-finite main verb *maar* (hit).

(3) *Ram=ne* *mujhe* *tamaachaa* *maar* *di-yaa*
Ram=Erg me slap.M.Sg hit:MV give-Pfv.M.Sg:LV
'Ram slapped me (hit me with a slap).'

(4) *Ram=ne* *mujhe* *tamaachaa* *de* *maar-aa*
Ram=Erg me slap.M.Sg give:LV hit-Pfv.M.Sg:MV
'Ram slapped me (hit me with a slap).'

A list of Hindi aspectual light verbs and their meanings is shown in Table 1.[2] Fewer light verbs can appear in the reverse construction. The reverse construction is also restricted with respect to the main verbs that can appear in it. For instance, Hook (1974) has observed that typically verbs of running, throwing, hitting and breaking can form a reverse construction.

[1]The gloss used for a light verb refers to its meaning as a full verb. Abbreviations used are as follows. MV = main verb, LV = light verb, F = feminine, M = masculine; Erg = ergative, Nom = nominative, Gen = genitive, Dat = dative, Acc = accusative, Inst = instrumental, Loc = locative; Tr = Transitive, Intr = Intransitive; Pfv = perfective, Impfv = imperfective; Pres = present; Pron = pronoun; Sg = singular, Pl = plural; '-' indicates a morpheme boundary, '=' separates a clitic from a lexical item, and what follows ':' indicates whether a verb is main or light.

[2]The semantic details in the table is based on Hook (1974) and Abbi and Gopalakrishnan (1991) (see also (Butt, 1994)). The light verb in the reverse construction also adds notions of extreme suddenness or non-volitionality. 'N' indicates that there were no examples either in the literature or in the EMILLE corpus (www.ling.lancs.ac.uk/corplang/emille), and native speakers could not construct a grammatical sentence involving the reverse construction.

Light verbs	Semantics	Reverse	Light verbs	Semantics	Reverse
Transitive			**Intransitive**		
baith (sit)	regret	N	*aa* (come)	completion	Y
dal (put)	thoroughness, violence	N	*jaa* (go)	completion	Y
de (give)	benefaction (self)	Y	*pad* (fall)	suddenness	N
le (take)	benfaction (others)	Y	*nikal* (leave)	suddenness	Y
maar (hit)	suddenness, violence	Y	*uth* (rise)	regret, suddenness	Y
nikaal (remove)	contempt, violence	N			

Table 1: *Aspectual Light Verbs*

Syntactically, the two verbs in both constructions form a single unit and have the same phrase structure configuration (the tests presented in Butt (1994) for the standard complex predicate construction also apply to the reverse complex predicate construction). The two constructions differ with respect to the auxiliaries that can take each of them as arguments. The standard construction can appear with all auxiliaries in the language as shown below by the appearance of the passive auxiliary *jaa* (go), the imperfective auxiliary *rah* (stay) and the tense auxiliary *ho* (be). With the reverse construction, only the tense auxiliary can appear (6) but not the imperfective or the passive auxiliary.

(5) *Ram=ka* *ghar* *beech* *di-yaa* *jaa* *rah-aa* *hai*
Ram.M=Gen house.M.Sg sell:MV give-M.Sg:LV go stay-Impfv.M.Sg be.Pres.3.Sg
'Ram's house is being sold off.'

(6) *Ram=ne* *kitaab* *jor=se* *de* *phekh-aa* *th-aa*
Ram.M=Erg book.M.Sg force=Inst give:LV throw-Pfv.M.Sg:MV be.Past-M.3.Sg
'Ram threw the book forcefully.'

The above data shows that in addition to being more restricted internally (which main verbs and light verbs can combine), the reverse construction is also restricted externally (which auxiliaries can take as argument the reverse construction). We show in this paper that their main distinction is functional, i.e. with respect to which of the main and light verb is the head of the clause. The prime evidence for our claim is that case assignment is governed by the second verb in the complex predicate, i.e. by the light verb in the standard construction and the main verb in the reverse construction. Finally, we argue that the light verb inherits its argument-structure from the main verb in the standard but not in the reverse construction.

2 Case Assignment

Evidence from case assignment shows that the two constructions differ functionally and that case is assigned by the last verb of the construction irrespective of its 'lightness'. We focus on the alternation between the ergative and the unmarked (labeled Nominative elsewhere) case on the subject of finite clauses. The assignment of these two cases can be captured by the following rules:

`Rule 1`: *By default, the subject is unmarked.*

`Rule 2`: *If the verb is transitive and perfective, then the subject is assigned ergative* (ERG) *case.*

`Rule 3`: *If the verb is intransitive and perfective, denotes a bodily/sound emission event, and the action is purposeful on the actor's part, then the subject is assigned* ERG *case.*

The selection of ergative case in Hindi is aspectually-driven. The ergative case is restricted to subjects of transitive verbs in the perfective aspect, which is marked by adding the suffix *-(y)aa/ii* to the stem (7).

(7) *Ram=ne* *ghar=ko* *banaa-yaa*
Ram=Erg house=Dat make-Pfv.M.Sg
'Ram made the house.'

In contrast, when the transitive verb is imperfective i.e., either in the habitual (8a) or the future (8b), the subject is unmarked.

(8) a. *Ram* *ghar=ko* *banaa-taa* *hai*
Ram house=Dat make-Impfv be
'Ram makes the house.'

b. *Ram* *ghar=ko* *banaa-yeg-aa*
Ram house=Dat make-Fut-M.Sg
'Ram will make the house.'

While subject case assignment in transitive verbs is purely aspect-driven, in intransitive verbs, it is also motivated by the meaning of the verb itself. The subject of most intransitive verbs is unmarked for case, as shown below for *bhaag* (run).

(9) a. *Ram* *bhaag-aa*
Ram.M run-Pfv.M.Sg
'Ram ran.'

b. **Ram=ne* *bhaag-aa*
Ram=Erg run-Pfv.M.Sg
*'Ram ran.'

In addition to intransitive verbs that take only an unmarked subject, some (called intransitive unergative verbs by Butt and King (2002)) can also select either an ergative or an unmarked subject in the perfective. Such verbs are primarily 'bodily/sound emission' verbs such as *khaas* (cough), *bhauk* (bark), *cillaa* (yell), *muut* (urinate), and *thuuk* (spit) (de Hoop and Narasimhan, 2008). One such alternation is shown below.

(10) a. *Ram* *khaans-aa*
Ram cough-Pfv.M.Sg
'Ram coughed (without meaning to).'

b. *Ram=ne* *khaans-aa*
Ram=Erg cough-Pfv.M.Sg
'Ram coughed (purposefully).'

The default subject for the verb *khaans* (cough) is unmarked as in (10a). However, if the action was intentional, as if to obtain someone's attention, the subject is assigned ergative case (10b). This intention cannot be called volitionality since verbs like *bhaag* (run), shown above, where the actor typically employs volition, can only take an unmarked subject. The ergative-unmarked alternation has previously been explained as the "conscious control that an agent is interpreted to have over the action" (Mohanan, 1994, p. 71). This notion has also been termed *conscious choice* (Butt, 1994, p. 102). Both these analyses suggest that if the action was performed under the control of the actor, the subject is assigned ergative case and otherwise, is unmarked. We argue that the subject case alternation is based on a narrower constraint; a first approximation suggests that it has to do with a kind of 'purpose' with which the agent performs the act. Moreover, the context in which such actions are used tends to be negative. This is shown by the following set of examples.

(11) a. ***vo*** *chillaa-yaa* *"aag"*
Pron.3.Sg yell-M.Sg "fire"
'He yelled, "fire"!'

b. *#us=ne* *chillaa-yaa* *"aag"*
Pron.3.Sg=Erg yell-M.Sg "fire"
#'He yelled, "fire"!'

c. *us=**ne*** *jaanbooj=kar* *chillaa-yaa* *“aag”*
Pron.3.Sg=**Erg** purpose=do yell-M.Sg “fire”
‘He yelled on purpose, “fire”!’

In (11), if the actor yelled “fire”, then the subject by default must be unmarked (11a). Without any context, (11b) is infelicitous. If the intention was to perform the act purposefully, for instance, if the actor intended to frighten people on purpose or pretended that there was a fire when there wasn't one, an adverbial modifier to that effect could be used and then the subject would be assigned ergative case (11c). As shown below, Rules 1-3 also apply to subject case assignment in complex predicate constructions.

Previous research on standard complex predicate construction has shown that the light verb always assigns case to the subject (Butt and King, 2002); the subject must be ergative if the light verb is transitive and unmarked if the light verb is intransitive. (The (in)transitivity of the light verb is a leftover from its non-idiosyncratic, main verb usage.) We show that this pattern does not apply to the reverse construction and here the main verb that assigns case to the subject.

The transitive verb *gaa* (sing) can only take an ergative subject in the perfective in the single predicate construction, see (7). However, in a complex predicate construction with this main verb, if the light verb is transitive e.g. *daal* (put), then the subject is assigned ergative case (12a) and if the light verb is intransitive e.g. *pad* (fall), then the subject is unmarked (12b).

(12) a. *Ram=ne* *gaanaa* *gaa*
Ram.M=Erg song sing:MV
daal-aa
put-Pfv.M.Sg:LV
‘Ram sang a song (had to).’

b. *Ram* *gaanaa* *gaa*
Ram.M song sing:MV
pad-aa
fall-Pfv.M.Sg:LV
‘Ram sang a song (without wanting to).’

The intransitive verb *daud* (run) can co-occur with an intransitive light verb and take an unmarked subject, as in (13a). However, it cannot co-occur with a transitive light verb. In fact, among intransitive verbs, only bodily/sound emission verbs can combine with transitive light verbs.

(13) a. *Ram* *daud* *pad-aa*
Ram.M run:MV fall-Pfv.M.Sg:LV
‘Ram ran.’

b. **Ram=ne* *daud* *daal-aa*
Ram.M=Erg run:MV put-Pfv.M.Sg:LV
*‘Ram ran.’

The subject of bodily/sound emission verbs can be either unmarked (14a) or ergative (14b) depending on whether the light verb is transitive or intransitive respectively.

(14) a. *Ram* *ciikh* *pad-aa*
Ram.M scream:MV fall-Pfv.M.Sg:LV
‘Ram screamed suddenly.’

b. *Ram=ne* *ciikh* *daal-aa*
Ram=Erg scream:MV put-Pfv.M.Sg:LV
‘Ram screamed violently.’

As can be seen from examples (12-14), in a standard complex predicate construction, case assignment on the subject depends on the (in)transitivity of the light verb. Rules 1-3 also apply for subject case assignment in the reverse construction, but, this time, the main verb governs case assignment. Recall that in the reverse construction, the light verb precedes the main verb. Even though the light verb *de* (give) is transitive, the subject in (15) is unmarked for case. This is because the main verb *bhaag* (run) is intransitive.

(15) *Ram* *de* *bhaag-aa*
Ram.M give:LV run-Pfv.M.Sg:MV
‘Ram ran (rapidly).’

In contrast, when the transitive light verb *de* (give) forms a reverse complex predicate in (16) with a transitive main verb like *maar* (hit), the subject is ergative. Similarly, even with an intransitive light verb *jaa* (go) in (17), the transitive main verb *beech* (sell) selects for an ergative subject.

(16) *Ram=ne* *Leela=par* *kiitaab* *de* *maar-ii*
Ram.M=Erg Leela=Loc book give:LV hit-Pfv.F.Sg:MV
'Ram threw the book on Leela (forcefully).'

(17) *Ram=ne* *apnaa* *makaan* *jaa* *beech-aa*
Ram.M=Erg self house go:LV sell-Pfv.M.Sg:MV
'Ram sold his house.'

As expected, when both verbs in the reverse construction are intransitive, the case on the subject is unmarked. This is shown in (18) with the intransitive main verb *bhaag* (run) and the light verb *nikal* (leave).

(18) *Ram* *kamre=se* *nikal* *bhaag-aa*
Ram.M room=Inst leave:LV run-Pfv.M.Sg:MV
'Ram ran from the room.'

We have thus shown that while the light verb assigns case to the subject in the standard construction, the main verb assigns case to the subject in the reverse construction. Case assignment in complex predicate constructions is therefore positional, i.e., assigned by the last verb of the complex predicate. In the next section, we show that to model that generalization, case assignment in Hindi must be done at the lexical level rather than at the phrasal level.

3 An HPSG Analysis

In this section, we model Hindi case assignment rules in HPSG and suggest that case assignment in Hindi must be done at the lexical level rather than at the phrasal level. We also propose that the light verb inherits its argument-structure from the main verb in the standard, but not in the reverse complex predicate construction.

HPSG is a constraint-based formalism where the different aspects of words or phrases, called *signs* (phonology, syntax, sematics) are described in parallel. The signs are assigned types organized in a hierarchy. Each type is associated with certain constraints and inherits the constraints of its supertype(s). Every feature or constraint specified as appropriate for the supertypes is also appropriate for the subtypes. The Hindi case values are organized as shown in Figure 1. Case in Hindi is either marked or unmarked; if it is marked, it can be assigned one of the various cases such as ergative (ERG), dative (DAT), etc. We model the three aforementioned rules for ergative and unmarked case on the subject as follows. First, the feature CASE is specified as having a default value of unmarked (`Rule 1`) as shown in (19). The symbol '/' indicates the default value of the feature; this value is defeasible. In other words, if there is no case specification, then the NP is unmarked. The default in (19) is overriden by the other two case assignment constraints. (Importantly, non-bodily emission intransitive verbs *strictly* require their subjects' case to be *unmarked*.)

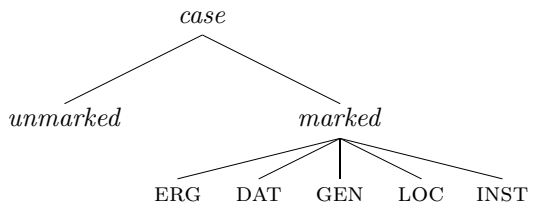


Figure 1: *Hindi Case Ontology*

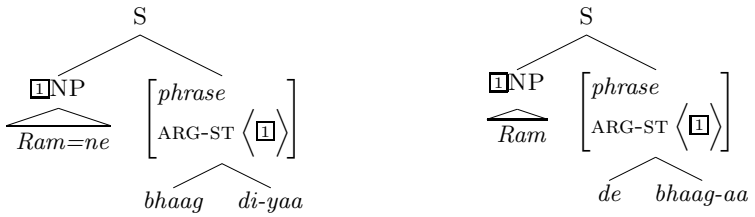
(19) $\left[\text{CASE} \quad \text{/unmarked}\right]$

Importantly, case assignment constraints must apply to a projection's *lexical* head in Hindi. This is because any informational difference between the standard and reverse construction disappears at the construction's mother node, as illustrated by the following two examples where the standard versus the reverse construction have the same main and light verb. The subject in (20a) bears ergative case because the second verb (light) is transitive; in contrast, the subject in (20b) is unmarked because the second verb (main) is intransitive. The simplified phrase structure trees for the standard and the reverse construction in (20) is shown in (21a) and (21b) respectively.

(20) a. *Ram=ne* *bhaag*$_{\textbf{Intr}}$ *di-yaa*$_{\textbf{Tr}}$
Ram.M=Erg run:MV give-Pfv.M.Sg:LV
'Ram ran.'

b. *Ram* *de*$_{\textbf{Tr}}$ *bhaag-aa*$_{\textbf{Intr}}$
Ram.M give:LV run-Pfv.M.Sg:MV
'Ram ran (rapidly).'

(21)



A comparison between the standard (21a) and the reverse (21b) constructions' respective trees suggests that any informational difference between the two constructions, such as argument-structure (and, similarly, for other syntactic features which are not shown for space reasons) will disappear at the phrasal level. The mother nodes' syntactic properties are identical, and it is therefore not clear how one would model differences in the constraints on the subject's case in the two constructions. But, the syntactic information associated with the right daughter crucially depends on whether it is a light verb or the main verb. By having case assignment constraints apply at the lexical level, we can capitalize on this fact.

`Rule 2` is modeled in (22). The left hand side of the rule preceding the arrow lists the constraints that must be fulfilled in order for the right hand side to be true of a structure. Note that these feature structures are simplified and only show the attributes relevant to the present analysis.

(22) *Rule 2*

$$\left[\begin{array}{l} \textit{tv-lxm} \\ \text{HEAD} \quad \left[\text{ASP} \quad \left[\textit{perf}\right]\right] \end{array}\right] \Rightarrow \left[\text{ARG-ST} \quad \left\langle \text{NP}\left[\text{CASE} \quad \textit{erg}\right], \ldots \right\rangle\right]$$

The rule in (22) reads: If a verb is of type *tv-lxm* i.e., transitive, and its aspectual value (ASP) is perfective (PERF), then the subject (the first NP in the argument structure) is assigned ergative case. The aspectual value of the verb is treated as a head feature since it affects verbal morphology. As expected, in complex predicate constructions, the (in)transitivity of the second verb determines case assignment to the subject.

(23) *Ram=**ne*** *ciikh*$_{\textbf{Intr}}$ *daal-aa*$_{\textbf{Tr}}$
Ram.M=**Erg** scream:MV put-Pfv.M.Sg:LV
'Ram screamed violently.'

In (23), the intransitive main verb *ciikh* (scream) is non-finite and it is the light verb *daal* (put) that is transitive and perfective. Therefore, as predicted by (22), the subject is assigned ergative case. This example also clarifies the motivation for selecting *tv-lxm* instead of simply using the argument structure list to determine if the verb is transitive (two NP arguments on the ARG-ST list) or intransitive (one NP argument on the ARG-ST list). Although we have a transitive light verb in (23), its ARG-ST list has only one NP because the main verb is intransitive. Therefore, using the ARG-ST list of the light verb will not help determine its (in)transitivity and the applicability Rule 2 in the standard complex predicate construction. We surmise that the types *tv-lxm* and *iv-lxm* of light verbs are a synchronically arbitrary leftover of their main verb uses.

While the assignment of ergative case is straightforward, recall that the assignment of ergative case to the subject of an intransitive verb (`Rule 3`) is more constrained. The relevant lexical constraint is shown in (24) using Minimal Recursion Semantics following Copestake et al. (2005). The SEM value encodes the central predication of a phrase as its KEY and a list of relevant semantic relations RELS.

(24) *Rule 3*

$$\left[\begin{array}{l} \textit{iv-lxm} \\ \text{HEAD} \quad \left[\text{ASP} \quad \left[\textit{perf}\right]\right] \\ \text{SEM} \quad \left[\begin{array}{ll} \text{KEY} & \boxed{3}\left[\begin{array}{ll} \textit{bodily/sound-emission-rel} & \\ \text{EVENT} & \boxed{2} \\ \text{ARG} & \boxed{1} \end{array}\right] \\ \text{RELS} & \boxed{3} \oplus \left[\begin{array}{ll} \textit{on-purpose-rel} & \\ \text{EVENT} & y \\ \text{ARG1} & \boxed{1} \\ \text{ARG2} & \boxed{2} \end{array}\right] \end{array}\right] \end{array}\right] \Rightarrow \left[\text{ARG-ST} \quad \left\langle \text{NP}\boxed{1}\left[\text{CASE} \quad \textit{erg}\right]\right\rangle\right]$$

The intransitivity of the verb is shown by *iv-lxm* and its aspectual value (ASP) is indicated as perfective (*perf*). Tag identity is used to indicate that information is shared between parts of the structure, for example that the agent argument for both the *bodily/sound-event-rel* and *on-purpose-rel* is the same. Semantically, (24) introduces a (key) relation of type *bodily/sound-emission-rel* (supplying an event variable 2) with only one additional argument. This argument is identified with the index of the subject NP 1. The semantic contribution of purposefulness is integrated in the RELS list of the semantics SEM as an additional *on-purpose-rel* where the two arguments are the subject 1 and the event 2.[3] The application of (24) can be shown by comparing the following examples.

(25) a. *Ram* *khaans-aa*
Ram cough-Pfv.M.Sg
'Ram coughed.'

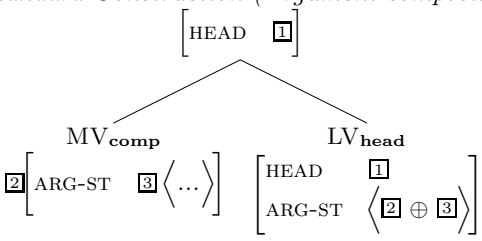
b. *Ram=**ne*** *khaans-aa*
Ram=**Erg** cough-Pfv.M.Sg
'Ram coughed purposefully.'

In both examples, we have an intransitive bodily emission verb. However, when there is no purposefulness to the action, then by default (`Rule 1`), the subject is unmarked for case (25a). When the action is committed on purpose, as in (25b), the subject is assigned ERG case by Rule 3. We have now implemented the basic lexical case assignment constraints in HPSG. As discussed previously, the main difference between the standard and the reverse construction impacts which verb concerns which of the main and light verbs is the construction's head. In what follows, we propose an analysis of both constructions that involves argument composition in the standard but not the reverse construction.

[3]Technically, what is on purpose is the action and not the event. We leave this issue to another venue.

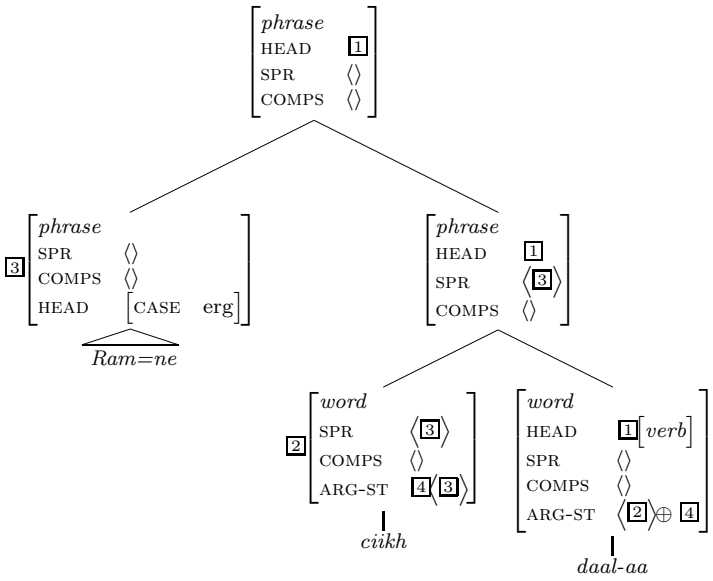
The two verbs in the standard complex predicate construction form a *clause-union* structure (Aissen and Perlmutter, 1976), i.e., the two verbs do not function as heads of independent clauses but form a complex predicate of a single clause. Within HPSG, such constructions have been analyzed as involving an operation of *argument composition* wherein the light verb is considered an operator that subcategorizes for the main verb and includes in its argument structure what its complement verb subcategorizes for. Such analysis has been proposed for various Romance complex predicates (Abeillé and Godard, 2002, 2007). An argument composition analysis is appropriate for the standard construction; as both the syntactic and the semantic head of the standard construction, the light verb in the standard construction subcategorizes for the main verb and inherits its argument structure. This is shown in (26) with an abbreviated phrase structure tree.

(26) *Standard Construction (Argument composition)*



In (26), the light verb is the head of the construction as indicated by the matched tag 1 at the lexical and phrasal level.[4] The argument structure (ARG-ST) of the light verb includes the main verb (2), indicating that the light verb subcategorizes for it. The entire ARG-ST of the main verb i.e., the subject and its possible complements (3) is inherited by the light verb. This is illustrated for the example in (23) whose simplified structure is shown in (27).

(27)



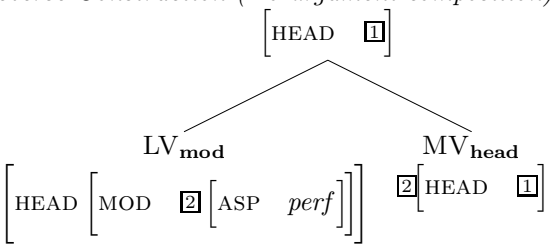
The tree representation in (27) only outlines the syntactic and argument structures component of example (23). As shown in (22), ergative case assignment on the subject in (27) is constrained by `Rule 2`. The subject (3) of the intransitive main verb *ciikh* (scream) (2) is placed on the specifier list as well as the ARG-ST list of the main verb. The light verb *daal* (put) subcategorizes for the main verb as indicated by 2 in its ARG-ST. The argument structure (4) of the main verb, consisting in this case of only a subject requirement, is inherited by the light verb. Therefore, the

[4]The labels MV (main verb) and LV (light verb) are purely mnemonic and provided to ease the reader's understanding.

ARG-ST list of the light verb *daal* (put) is a concatenation of [4] (ARG-ST of the main verb) and [2] (main verb). Since the verb *daal* is transitive, the lexical constraint in (22) applies. That the light verb inherits its complement verb's subject requirement explains why transitive light verbs cannot combine with non-bodily emission intransitive verbs. Non-bodily emission intransitive verbs *strictly* require their subjects to bear *unmarked* case, while `Rule 2` illustrated in (22) requires the (inherited via clause-union) subject of *daal* (put) and other transitive light verbs to bear *ergative* case.

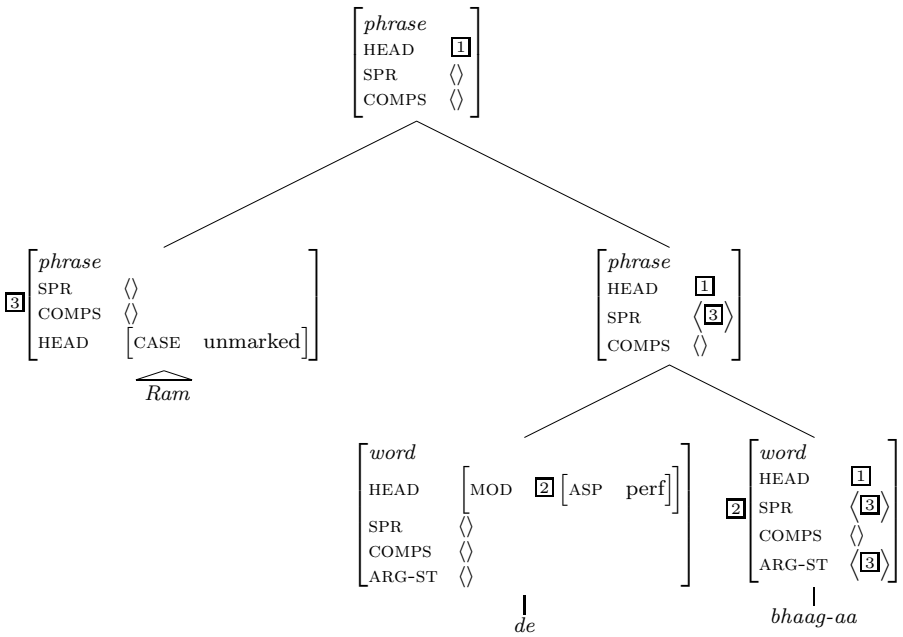
A typical argument composition analysis can account for the standard construction in Hindi. However, in the reverse construction, the main verb (which assigns case) is the syntactic head and the light verb is the semantic head; there is thus a dissociation between semantic and syntactic headedness. Additionally, (26) shows that argument selection in Hindi takes place from right to left, i.e., the light verb would be expected to follow the main verb if it were the head of the reverse construction. We therefore need another mechanism to capture both these facts. We analyze light verbs in the reverse construction as modifiers that take what they modify as arguments, modeled using the MOD feature, as outlined in (28).

(28) *Reverse Construction (No argument composition)*



Crucially, the non-null value of the MOD feature indicates that the light verb cannot be the head of the construction. The light verb modifies the main verb but does not inherit its argument structure. The reverse construction in (15) is illustrated below.

(29)



In (29), the light verb *de* (give) modifies the main verb and the head of the phrase is the main verb *bhaag* (run). Notice that the subject Ram ([3]) appears only on the specifier and argument-structure list of the main verb, as there is no argument composition in the reverse construction.

4 Conclusion

This paper has focused at the Hindi reverse complex predicate constructions in which the light verb precedes the main verb, in contrast to the standard complex predicate construction. We argued that, although the main and light verbs in both complex predicate constructions occur in the same phrase structure configuration, the two constructions differ functionally. The light verb is the head in the standard construction and the main verb in the reverse construction, as evidenced by the fact that the last verb, whether it is a light verb or main verb, assigns case to the subject. We also argued that transitive light verbs can only combine with those intransitive main verbs whose semantics represent bodily/sound emission. The data presented in this paper support two more general claims. First, case assignment constraints must apply at the lexical rather phrasal level, as, the syntactic information carried by the combination of a main and light verb is the same, irrespective of the order of the two verbs. Second, the Hindi reverse construction shows a dissociation between semantic and syntactic headedness; while the main verb assigns case, the light verb is the aspectual functor. This distinction suggests that the mapping between aspectual semantics and syntactic structure need not be uniform within a language, something that a framework such as HPSG that distinguishes between syntactic heads and semantic heads (in head-modifier constructions) can easily model. Further research is needed to determine the range of main verbs and light verbs that can appear in the reverse construction and the additional meaning contributed by the reverse complex predicate construction.

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Temporal dependency in extensional contexts in Korean

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1 The aim of the paper

This paper aims to defend a non-movement theory of embedded tenses in relative clauses in Korean. Abusch(1997), Ogihara(1996), Stowell(2007) and many others entertain the idea of the movement of embedded present tenses in English and Japanese. In this paper, however, it is proposed that we can dispense with such a tense movement if we take the position that temporal dependency between clauses is determined depending on what a reference of the embedded tense takes as its antecedent; it is suggested that the embedded reference time of relative clauses, as a temporal pronoun, is *pro* so that it does not need to move out to find a suitable antecedent. Rather, it can freely take as its antecedent either the speech time or a higher event time, yielding the ambiguity in relative clauses under consideration.

2 The issue

2.1 The independent reading of relative clause tenses

In some views such as Enç(1987) and Abusch(1988), it is often regarded that, English relative clause tenses occurring in extensional contexts receive only independent interpretation in relation to matrix clause tenses.

(1) Sue met a woman whom Sam met.
(1-a) Yesterday Sue met a woman whom Sam met the day before.
(1-b) Yesterday Sue met a woman whom Sam met yesterday.
(1-c) Yesterday Sue met a woman whom Sam met today.

The sentences in (1) show that relative clauses tense do not need to depend on or anchor to matrix tenses. Because both matrix and relative tenses in (1-a~c) are to be independently evaluated with respect to the speech time, the relative tense in (1-c) have a freedom even to place the embedded event after the matrix event, which is not permitted in complement clauses as below:

(2) Sue said that Sam met a woman.
(2-a) ***Yesterday***, Sue said that Sam met a woman ***the day before***.
(2-b) ***Yesterday***, Sue said that Sam met a woman ***on that day***.
(2-c) ****Yesterday***, Sue said that Sam met a woman ***today.***

In contrast to (1), since complement tenses are to be evaluated with respect to matrix tenses, the embedded past tense in (2-c) does not allow a time adverb '*today*' that leads to such an independent reading as in (1-c) where the event of Sam's meeting with a woman takes place later than that of Sue's saying event. It indicates that relative clause tenses are different from complement clause ones in that they can receive a reading independent of structurally higher tenses.

2.2 The dependent reading of relative clause tenses

However, the following examples show that relative clause tenses are not confined to have an independent reading in English(from Stowell 2007).

(3) a. Sandra will lend her car to a man [who **is sitting** in her office].
b. Sam will offer a job to a/any candidate [who **filled out** an application (the day before)].

If the relative clause present tense in (3-a) is evaluated only with respect to the speech time, it cannot be interpreted as simultaneous to the matrix future tense, which is the reading that (3-b) has to get. Also, only the independent reading is available, we cannot account for why the relative clause past tense in (3-b) is to be interpreted as past from the matrix future tense, not from the speech time. Furthermore, in languages such as Japanese in (example 4 from Ogihara 1996) or Korean in (example 5 from S.Sohn 1998) below, relative clause tenses can receive both dependent and independent readings at the same time:

(4) Taroo-wa [nai-te i-**ru** otoko]-o mi-ta.
Taro-TOP cry-PROG-**PRES** man-ACC see-PAST
*"Taro saw a man who **was** crying (at the time of the meeting)"*
*"Taro saw a man who **is** crying (now)"*

(5) Mary-nun [John-i e ilk-**nun** chayk]-ul ilk-ess-ta.
Mary-TOP John read-**PRES** book-ACC read-PAST
*"Mary read a book that John **was** reading (at the time of the meeting)'*
*"Mary read a book that John **is** reading (now)'*

In Japanese or Korean, a present tense in relative clauses is ambiguous that it is interpreted simultaneous to the speech time or a matrix event time, as in (4) and (5).

2.3 Research question

The cross-linguistic facts presented above require us to provide the analysis that accounts for the temporal dependency between matrix and relative tenses in extensional contexts, not only in intensional ones. The traditional account of tense by Abusch(1988, 1997) cannot be extended to relative clauses tenses because, in her account, a temporal dependency between upstairs and downstairs tenses is formed by the mediating function of intensional verbs; relative tenses free from it do not have any link to matrix tenses for a dependent reading. Then, the question is how a dependent reading of relative tenses is derived in English and Korean; whether it is obtained differently from the way an independent reading of relative clauses is derived.

3 The movement theory of tense

3.1 Ogihara(1996)'s solution

Following the same line with Abusch(1988, 1997), Ogihara(1996) proposes that a Japanese present tense in relative clauses needs to move out a relative clause in order to get the independent reading in question. In Ogihara(1996), it follows from his empty or null tense theory positing that Japanese embedded clauses with a present tense is actually tenseless so that it has to be interpreted simultaneous to the tense c-commanding it. Thus, in order to receive the independent 'real present tense' meaning, a present tense has to move out the scope of the structurally higher tense at least in Japanese, as schematized as follows:

(6) a.[$_S$ …Tense$_1$ [$_{VP}$ **[NP…[s…Tense$_2$ V$_2$…]]**[$_{VP}$ V$_1$ e$_2$]]]
b.[$_S$ **[NP2$_2$…[$_S$…Tense$_2$ V$_2$** …**]]**[$_S$ …Tense $_1$ V$_1$ e$_2$]]

The embedded tense Tense$_2$ in (6-a) scopes out of the matrix tense Tense$_1$, as in (6-b), giving us the independent reading of the relative present tense in Japanese. Ogihara(1996) claims that the tense movement from (6-a) to (6-b) is optional in Japanese, giving rise to an ambiguity.

3.2 Stowell(1995a, 2007)'s solution

Stowell(1995a, 2007)'s analysis of relative clause tenses is on a totally different track from Ogihara(1996)'s analysis but it needs tense movement for the same reason. Adopting & modifying Zagona(1990), Stowell assumes that Tense predicates of a temporal relation between **Reference time** and **Event time**, both of which are associated with a Zeit Phrase(ZP) in syntax. Stowell(2007) proposes the Temporal Control theory positing that a reference time is a temporal PRO which has to be controlled. Since

a temporal PRO is to be controlled by the same type of elements, possible candidates for it should either be a matrix reference time(RT), that is the speech time(ST), or a matrix event time(ET).

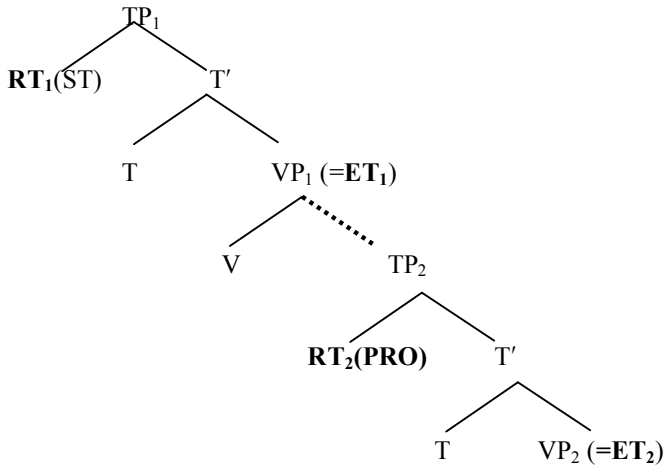

Figure 1 Stowell(2007)'s Temporal Control Theory

In Stowell(2007)'s analysis, **a reference time**, a temporal **PRO**, is to be controlled by one of closest temporal arguments according to Rosenbaum(1970)'s Minimal Distance Principle(MDP). Given this, the reference time of a relative clause is always to be controlled by the immediately preceding event time(ET_1) because ET_1 is the closest to it. It never takes the speech time(RT_1) as its controller because its farther than ET_1, which makes it impossible for us to get the independent reading where the embedded present tense is simultaneous with the speech time. Therefore, a tense movement is unavoidable in Stowell(2007) since, under the scope of matrix tenses, the temporal PRO cannot be free to go beyond it.

4 Proposed analysis: a non-movement theory of tense

4.1 Assumptions

The proposed analysis in this paper is based on the following three assumptions adopted from previous research:

(i) Temporal dependency is determined by the syntactic relation between temporal elements
(Ogihara1997, Higginbotham 2002, Stowell 1995a, 2007)
(ii) Tense is a binary predicate of temporal arguments, RT and ET.
(Zagona 1970, Higginbotham 2002, Stowell 1995a, 2007)
(iii) There is a strong structural analogy between pronouns and tenses (Partee, Krazter 1998),

By the assumption in (i), we state that temporal dependency is formed both in intensional and extensional contexts as long as there is a structural relation between temporal elements. And, unlike the prevailing assumption based on Partee(1972), as in (ii), we view that tense itself is not referential; tense is a relation or function that it does not directly denote a specific time interval. Nevertheless, by (iii), we agree that there is a strong analogy between pronouns and tenses because a Reference Time is a temporal pronoun that builds an anaphoric relation between clauses and sentences, thereby getting Tense an anaphoric meaning.

4.2 PRO vs. pro

The proposal made in this paper largely borrows its main ideas from Higginbotham(2006) and Stowell(2007). The diverging point of the proposed analysis from their account is about the nature of a reference time, RT. Stowell(2007) claims that a RT is a temporal PRO which occupies a syntactic position and is to be controlled by the closest temporal element. However, it is claimed in this paper that a RT should be a temporal *pro*. Temporal *pro* has the three following characteristics: (i) it usually takes a

phonetically null form and (ii) it is to be considered as an implicit temporal argument which does not necessarily occupy a syntactic position, following the spirit of Higginbotham(2006). Finally, (iii) there is no restriction on the selection of its antecedent. It can take as its temporal antecedent either the speech time(=a matrix RT) or a matrix event time(ET). It is parallel to the interpretation of person pronouns, as below:

(7) a. John thinks that **he** is smart.
b. John met a woman who admires ***him***.

As in (7-a) and (7-b), a person pronoun '*he*' or '*him*' takes as its antecedent 'John' a NP c-commanding it structurally or a certain NP contextually provided. Likewise, a temporal pronoun RT can refer to the event time structurally provided or the speech time contextually given. However, a PRO does not have this kind of dual usage; it has to be controlled syntactically/structurally. Considering this, it is not surprising to propose that a reference time has to be considered as *pro*, but not PRO.

Given this, the structure of the Korean example repeated in (8) will be presented as follows:

(8) Mary-nun [John-i e ilk-**nun** chayk]-ul ilk-ess-ta.
Mary-TOP John read-**PRES** book-ACC read-PAST
*"Mary read a book that John **was** reading (at the time of the meeting)'*
*"Mary read a book that John **is** reading (now)'*

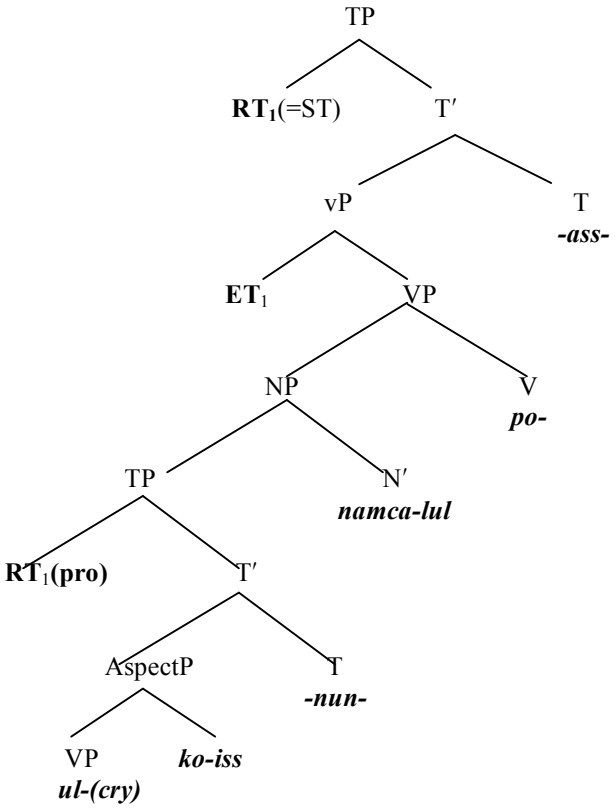

Figure 2 *Present under past* in relative clauses in Korean

As in the tree diagram above, the embedded temporal *pro*, RT, can be anaphoric to the speech time and the matrix event time which is immediately above in the structure.

Note that we proposed that a reference time of relative clauses tenses is a temporal *pro*. Yet, we retain Stowell(2007)'s solution of temporal PRO for the analysis of embedded tenses in complement clauses. Then, the complete proposal will be given as:

(i) A reference time is a temporal pronoun which is responsible for an anaphoric relation of tenses.
(ii) In relative clauses, a reference time is a temporal *pro*.
(iii) In complement clauses, a reference time is a temporal PRO to be controlled because indirect speech predicates or intensional predicates select complement clause whose reference time is PRO.

The advantages of the hybrid proposal are many. First, (i) we do not need to posit a tense movement out of a clause which seems to unnatural. Second, (ii) the proposal accounts for the analogy between pronouns and tenses in terms of a temporal *pro*/PRO interpretation of a reference time. What makes the analogy true is the temporal pronoun, RT, but not tense itself, which makes more sense considering that RTs, temporal pronouns, are pronouns. Finally, (iii) the distinction between temporal PRO and *pro* enables us to nicely capture the contrast between complement and relative clause tenses. The selection of a temporal PRO is attributed to the lexical property of matrix predicates such as *saying* verbs, as attempted by Abusch(1997). The lexical property of the predicates become clearer, by looking at the facts that the restriction of an obligatory dependent reading is unique to complement clauses: in other structures including subjective, relative, conjunctive clauses, and noun complement structure, embedded present tenses can be either anaphoric or indexical in Korean.

4.3 Supporting evidence

An argument from scopal ambiguity lends a support for the proposed non-movement analysis. Consider the following example:

(9) Modun namca-ka [LA-ey sa-nun yeca-lul] manna-ss-ta.
All man-Nom LA-in live-**PRS** woman-Acc meet-PAST-Dcl.
"Reading#1: [every man]1 [e1 meet-**PST** [a woman who live-**PRS**] *]*
*(de dicto) = everyman met a woman who **was** living in LA [**at that time**].*
"Reading#2: [every man]1 [a woman who live-**PRS**] [e1 meet-**PST** e2*]*
*(de dicto) = everyman met a woman who **is** living in LA [**now**].*
"Reading#3: [a woman who live-**PRS**] [every man]1 [e1 meet-**PST** e2]
*(de re) = there is a woman who **is** living in LA **now** and whom everyman met].*
***"Reading#4**:* [a woman] [every man]1 [e1 meet-**PST** e2 [who live-**PRS**]]
*(de re) = there is a woman who **was** living in LA [**at that time**] and whom everyman met].*

The sentence in (9) contains a universal quantifier '*modun*(=all)' and an indefinite NP '*yeca*(=a woman).' A *de dicto* reading of an indefinite NP is usually considered as a result of the NP movement out of the scope of the universal quantifier '*modun*(=all).' According to the movement theory of tense, Reading #1~3 are accounted for easily in terms of the movement of the relative clause including the indefinite NP. However, Reading #4 is not expected to arise according to the movement theory, because in the reading the head NP '*yeca*' moves out, but the relative clause has to remain inside the scope of the matrix tense. On the other hands, in the non-movement theory, all of the four readings are explained without trouble. The embedded present tense can receive anaphoric & indexical readings *in-situ* because of the nature of the temporal pro, the reference time; what moves out is the indefinite NP and the universal quantifier, as usually assumed.

5 Conclusion

The discussion so far can be summarized as follows:

(i) Temporal dependency is the relation between temporal arguments, a reference time and an event time.
(ii) A reference time is a temporal pronoun which is responsible for an anaphoric relation of tenses.

(iii) In relative clauses, a reference time is a temporal *pro*.
(iv) In complement clauses, a reference time is a temporal PRO to be controlled because indirect speech predicates or intensional predicates select complement clause whose reference time is PRO.

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Multiple Wh-Fronting in Tree-Adjoining Grammar

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1 Introduction

The purpose of the present paper is to provide an analysis of multiple Wh-word fronting in Bulgarian (BG) and Serbo-Croatian (SC) within Frank's Lexicalized Tree Adjoining Grammar (TAG) formalism (2002, 2006). Additionally, I claim that the constraints on long-distance movement of w*h*-words in these languages follow straightforwardly from the locality properties of LTAG.

Multiple *wh*-word fronting in BG and SC interestingly differs from similar *wh*-word movements in English in several ways. In English, when a simple clause contains two *wh*-words, only a single *wh*-word appears at the front of the sentence. The parallel sentences in BG, example (1b) or in SC, example (1c) require that both *wh*-words appear at the front of the sentence. Following Richards, I assume that auxiliary clitics, e.g. "je", are placed in a phonological process. As their placement is orthogonal to the present syntactic treatment, I will not consider them here.

(1a) Who ate what?

(1b) Koj kakvo vizda?
who what sees
"Who sees what?"

(1c) Ko je koga vidjeo?
who AUX whom seen
"Who saw whom?"

In English, indirect questions, in which the matrix clause is declarative and the embedded clause is interrogative, require that a single *wh*-word appear at the front of the matrix clause, shown in example (2a), while additional *wh*-words appear in-situ. SC, example (2c), shows similar facts; however, Bulgarian, example (2b), requires that all *wh*-words appear at the front of the matrix clause.

(2a) Who did Peter think ate what?

(2b) Koj kakvo mislis ce iade?
who what think that ate
"Who do you think that ate what?"

(2c) Ko si tvrdio da je koga istukao?
who AUX claimed that AUX whom beaten
"Who did you claim beat whom?"

How can we explain the cross-linguistic *wh*-movement facts? Considering the BG and English data, Frank (2002) argues that the facts can be given a natural account in the LTAG formalism. Essentially, LTAG accounts for the English and BG facts by isolating cross-linguistic variation from the mechanisms of the syntax. The domain within which arguments of a lexical item can appear, which Frank terms the domain of locality, is limited to the structure of the elementary LTAG units: the elementary trees. It is these elementary units that vary cross-linguistically, not the syntax. Specifically, BG verbs project CPs with multiple specifiers, while English CPs have only one specifier, thus accounting for the simple clause cases in these two languages. The syntactic mechanism that derives long-distance movement, an operation called Adjoining, does not vary cross-linguistically. Cross-linguistic variation in long-distance *wh*-word movement is then isolated to the construction of the elementary units.

Frank's account of the BG facts does not accurately account for the SC *wh*-movement however. If verbs in SC project CPs with multiple specifiers, as BG trees do, the simple clause facts exemplified in (1c) are predicted; the differences between BG and SC indirect questions are not predicted. To account

for these differences, I make use of the insights of Boscovic (1997, 2002, 2003), Stjepanovic (2003) and Richards (2001) in proposing that the functional projections of SC can contain multiple specifiers of CP or multiple specifiers of TP, and that wh-words in SC posses focus features. These changes, along with the mechanisms of feature unification and feature clash already proposed by Frank (2002), allow the basic insights of Frank's account to be extended to SC. However, the present account fails to straightforwardly generalize to apparent BG violation of *wh*-islands. One possible analysis is presented;
.

The paper is structured as follows. First, I introduce LTAG, exemplified by deriving examples (1a) and (2a). Then I review the BG facts and demonstrate how Frank (2002) accounts for them. Next, I discuss the SC facts and propose an extension to Frank's account to cover the SC data. Finally, I present the *wh*-island facts and discuss the problem these facts present for the current account and possible solutions to these problems.

2 Introduction to LTAG

Tree Adjoining Grammar (TAG) is a mathematical formalism first formalized by Joshi et al (1975). More recently Frank (2002, 2005) outlined a TAG-based linguistic theory. While other TAG-based linguistic formalisms are possible, for simplicity, I refer to Frank's theoretical framework as L

LTAG syntactic structures are described in terms of syntactic tree structures and the syntactic derivation consists of two distinct processes. The first process constructs elementary trees from processes similar to Merge and Move (Chomsky 1995). These elementary trees are anchored by a single lexical item, encode argument structure and may extend up through a lexical anchor's maximal functional projection. In the second stage of syntactic derivation, elementary trees are combined in one of two manners: Substitution, which identifies argument relationships between trees, or Adjoin, which encodes recursion.

This process is exemplified in Figure 1, which contains the elementary trees necessary to derive examples (1a) and (2a). The lexical items 'who', 'what' and 'you' project phrases as high as the DP and the verb 'ate' projects to the CP. These trees are examples of initial trees, indicated by the α tag in the tree name. The elementary tree βthink contains a special foot node whose label matches that of the root node, a structural configuration which allows such elementary trees, called auxiliary trees, to combine through the Adjoin operation. Adjoin operates as follows: given an adjoining site, which can be almost any node in an initial or an auxiliary elementary tree, and an auxiliary tree of which the root and foot nodes' labels match the auxiliary site node label, the Adjoining process splits the adjoining site node into a top and a bottom node. The root node of the auxiliary tree is identified with the top half of the split adjoining site, and the foot node of the auxiliary tree is identified with the bottom half of the split adjoining site node. In essence, the tree being adjoined into is split, the auxiliary tree is inserted and the two trees are reassembled. A different special node, the substitution site, marked with a downward arrow, occurs in the verbal elementary trees below. It is at nodes such as these that argument elementary trees are combined with the trees of which they are arguments. This combination operation is called Substitution. Substitution involves the identification of a substitution site with the root node of an initial tree. This operation requires that the labels of the root node and substitution site match.

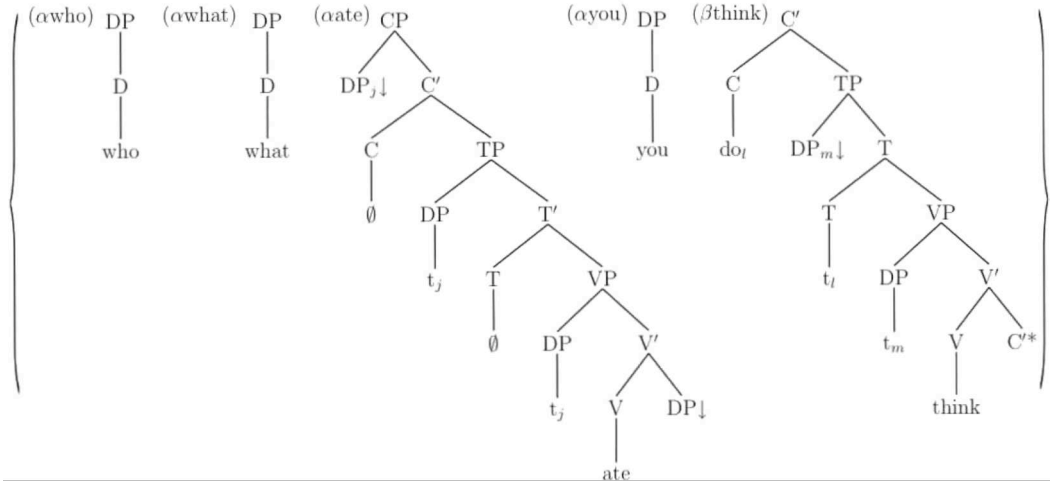

Figure 1: Elementary trees to derive examples 1a and 2a

The derivation of examples (1a) and (2a) follow from the definition of these two combination operations and the structure of the elementary trees in Figure 1. In Figure 2 arrows have been added to indicate the manner in which the elementary trees combine. αwho substitutes into αate at the upper DP node, while αwhat substitutes at the lower DP node, thus deriving example (1a). Continuing with the derivation of (2a), αyou is substituted into βthink at the DP node. βthink is then adjoined into αate at the C' node. The derived trees for (1a) and (2a) are given in Figure 3.

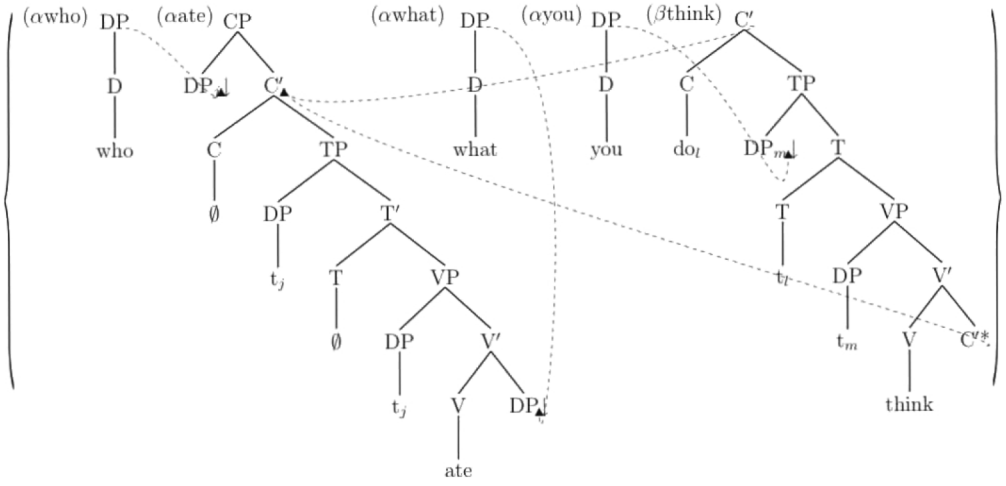

Figure 2: Example 2a derivation process

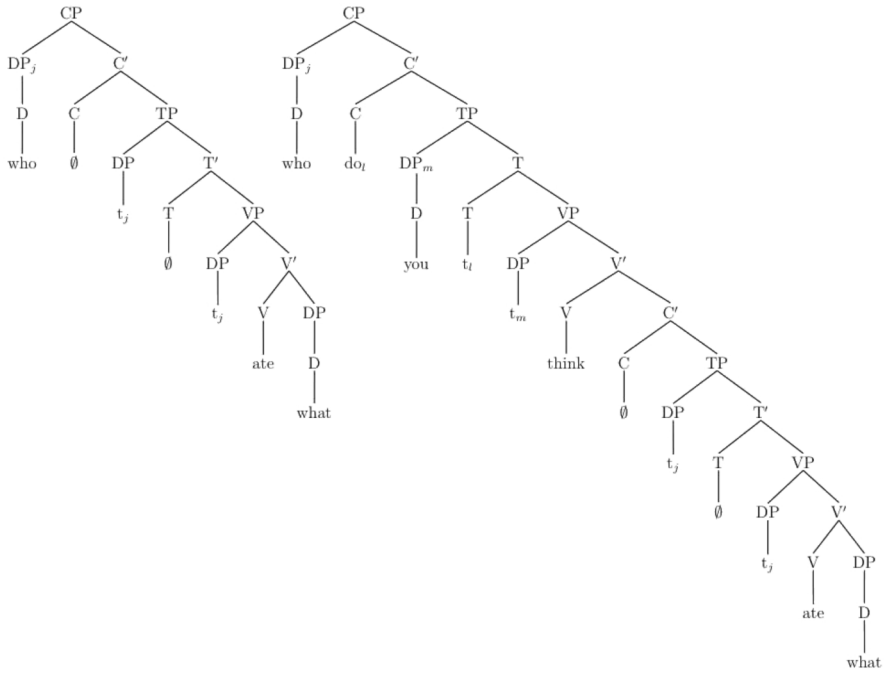

Figure 3: Examples 1a and 2a derived trees

Interestingly, both the fact that English only fronts a single *wh*-word in simple clauses and the fact that 'long-distance' *wh*-word fronting only fronts one *wh*-word follow from the definition of LTAG and the structure of the elementary trees. Given the elementary trees in Figure 1, Substitution and Adjoining do not permit the derivation of examples where multiple *wh*-words front in both the local and long-distance cases. The proper derivation seems to fall out of the definition of LTAG, assuming the trees in Figure 1. For details on the manner in which these trees can be generated using the familiar mechanisms of Merge, Move and feature checking see (Frank 2002). Note that I am assuming that case features on the substitution sites restrict which elementary trees may substitute at these nodes to the trees that contain the proper case. Thus, are blocked derivations where accusative case-marked *wh*-words substitute at nodes marked for nominative case. I will discuss shortly the technical aspects of this feature checking mechanism.

3 Bulgarian Data

As noted earlier, BG is a multiple *wh*-fronting language; all *wh*-words front in simple clauses and indirect questions. Thus example (1b), repeated here as (3), is acceptable but example (4), where a *wh*-word is left in-situ, is unacceptable. Similarly, while example (2b), repeated here as (6), is acceptable, example (7), where a *wh*-word is left in-situ, and example (8), where a *wh*-word has been moved only as far as the front of the embedded clause, are both unacceptable. In addition to these word order facts, examples (5) and (9) show that when the object *wh*-word has moved past the subject *w*h-word, superiority effects obtain and the sentence is judged ungrammatical.

(3) Koj kakvo vizda?
who what sees
"Who sees what?"

(4) *Koj vizda kakvo?
who sees what
"Who sees what?"

(5) *Kakvo koj vizda?
what who sees
"Who sees what?"

(6) Koj kakvo mislis ce iade?
who what think that ate
"Who do you think that ate what?"

(7) *Koj mislis ce iade kakvo?
who think that ate what
"Who do you think that ate what?"

(8) *Koj mislis kakvo ce iade?
who think what that ate
"Who do you think that ate what?"

(9) *Kakvo koj mislis ce iade?
what who think that ate
"Who do you think that ate what?"

4 Frank's Bulgarian LTAG Analysis

Frank is able to account for the differences between English and Bulgarian by positing that Bulgarian elementary trees contain multiple specifiers of CP. In the TAG framework, cross-linguistic variation is isolated to the construction of elementary trees; the TAG derivational mechanisms remain constant. The elementary trees necessary to derive example (1) are in Figure 4.

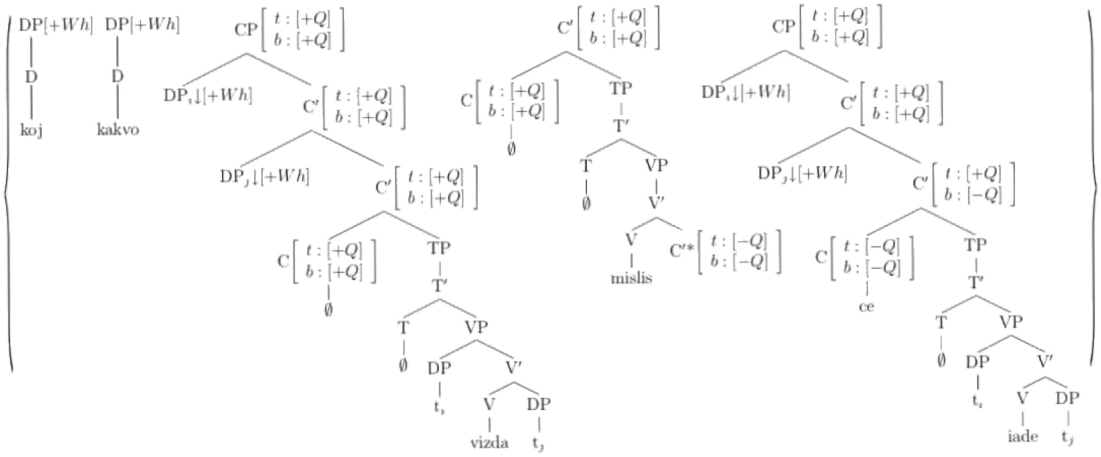

Figure 4: Derived tree for example 6

These elementary trees are elaborated with feature structures. To see that some additional restrictions on the derivation are necessary to avoid over-generation, note that without these features, the elementary trees provided in Figure 4 would serve to generate not only examples (3) and (6), but also (5), (8) and (9). (8) could be generated by the adjoining of the "mislis" auxiliary tree into the "iade" tree at the upper C' node. In order to eliminate this possibility, which Frank does not discuss, one could adopt a mechanism called 'feature clash'. Feature clash is a feature unification mechanism introduced by Frank (2002) to limit over-generation in another context, and it's application here is straight-forward.. Each node in an elementary tree consists of a feature matrix containing a top and a

bottom half. Each of these halves may contain various syntactic features. During an adjoining operation, when the adjoining site is split into a top and a bottom half, the feature structure is also split into a top and a bottom half. As the root node of the auxiliary tree is identified with the top half of the split node, the top feature structure of the two nodes being identified are unified. If unification fails, in other words if the feature structures do not match, the derivation crashes. Similarly, when the foot node of the auxiliary tree is identified with the bottom half of the split adjoining site node, the bottom halves of the two nodes are unified. At the end of the derivation, the top and bottom halves of every node are unified.

Feature clash occurs when the feature structure of a node in an elementary tree contains disparate features in its top and bottom halves. This mismatch is the clash, and it would, without intervention, cause a derivation using this tree to crash. The derivation can be saved, however, by adjoining a tree into the clashed node. Such a rescue would require that, in splitting the adjoining site node, the resulting feature unifications succeed. So, if the root node's features match those of the adjoining site's top feature, and the auxiliary tree's foot node's features match those of the adjoining site's bottom features, the unification would succeed. Because adjoining is the only way to save such clashed elementary trees, feature clash can be thought of as a method to force adjoining at a specific site. Deriving example (8) requires that the "mislis" auxiliary tree adjoin at the higher C' node, a possibility we want to avoid, while deriving (6) requires adjoining it at the lower one, which is the desired adjoining site. Feature clash at the lower C' node will require adjoining at this node. But what features should the feature clash make use of? Simplifying somewhat from Frank's presentation, if we assume that a *wh*-word in BG necessarily takes a question interpretation, it follows that a *wh*-word cannot be left at the head of an embedded declarative clause because that would cause the embedded clause to take an interrogative interpretation. Thus, in the "iade" elementary tree, the material above the lowest C' node takes an interrogative interpretation, while the material below it takes a declarative interpretation. Feature clash with a +Q feature in the top half and -Q in the bottom half of the lower captures this intuition. Furthermore, a tree such as "mislis", which embeds indirect questions, will require that the material in the elementary tree above the adjoining site take a question interpretation, and the material below it take an declarative interpretation.

With feature clash ruling out examples like (8), what of examples like (5) and (9), cases where superiority effects obtain? To rule out these cases, Frank (2006) assumes that superiority is a reflex of the A' position and, following Richards (1997), suggests that a local version of shortest move can explain superiority. I assume this to be the case as well, but it is interesting to note that Frank (2002) takes a different stance. There he argued that the adoption of tree-local constraints on movement, such as shortest move, would introduce redundancy into the LTAG system, which already derives many locality constraints. He argued that superiority is a pragmatic effect on the evidence that D-linked *wh*-words are immune to superiority effects. This argument is less convincing because it leaves unexplained why the A' position is uniquely affected by this pragmatic effect.

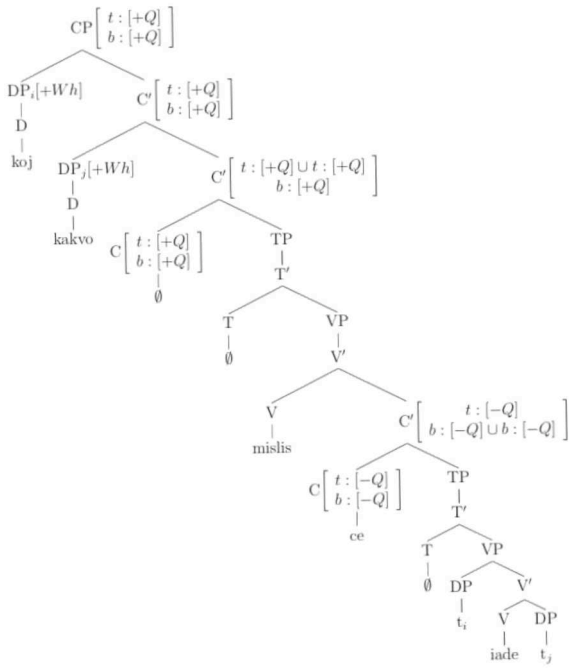

Figure 5: Derived tree for example 6

With the elementary trees defined, the derivations follow straightforwardly using substitution and adjoining. To derive example (1), the “koj” elementary tree substitutes at the upper DP node of the “vizda” tree, while the “kakvo” tree substitutes at the lower DP node. Example (6) follows similarly. After the argument elementary trees “koj” and “kakvo” substitute into the “iade” elementary tree, the “mislis” auxiliary tree adjoins at the lower C' node. Feature unification succeeds, resulting in the derived tree in Figure 5.

5 Serbo-Croatian Data

Similar to BG, SC fronts all *wh*-words in simple clauses, but unlike BG, superiority effects do not obtain between the fronted words. Thus, both example (10) and example (11), where the object *wh*-word appears before the subject *wh*-word, are grammatical. Also, unlike BG, SC fronts only one *wh*-word out of embedded declarative clauses. When both *wh*-words are fronted, as in example (15), the result is marginally acceptable at best, and plainly ungrammatical at worst, as in (16). Furthermore, in the context of embedded declarative clauses, superiority does not obtain between the *wh*-words, as shown by the grammaticality of both (13) and (14).

(10) Ko je koga vidjeo?
who AUX whom seen
“Who saw whom?”

(11) Kogo je ko vidjeo?
whom AUX who seen
“Whom saw who?”

(12) *Ko je vidjeo kogo?
who AUX seen whom
“Who saw whom?”

(13) Ko si tvrdio da je koga istukao?
who AUX claimed that AUX whom beat
“Who did you claim beat whom?”

(14) Koga si tvrdio da je ko istukao?
whom AUX claimed that AUX who beat
“Who did you claim beat whom?”

(15) ?Ko si koga tvrdio da je istukao?
who AUX whom claimed that AUX beat
“Who did you claim beat whom?”

(16) *Koga si ko tvrdio da je istukao?
whom AUX who claimed that AUX beat
“Who did you claim beat whom?”

6 Serbo-Croatian Analysis

The elementary trees Frank posited to account for BG do not generalize to the SC facts. However, the facts do tell us a few things about the assumptions we made earlier. First, the alternative explanation for superiority, as a pragmatic effect, makes no such predictions. In fact, we should then expect an explanation as to why *wh*-words in one language should be subject to pragmatic effects, and another language should fail to show them at all. On the other hand, the assumption that superiority was a reflex of the A' position predicts that if superiority effects do not obtain, then A' positions are not involved. In fact, there is good evidence that the *wh*-words in SC do not necessarily land in A' positions. Richards (1997, 2001) argued, on the evidence of weak crossover effects, scrambling and superiority, that SC *wh*-words can occupy multiple specifiers of TP (IP) in addition to the possibility that they occupy a single Spec,CP. The landing site of BG *wh*-words, he argued, must be Spec,CP and never Spec,TP. Boskovic (2002), based on cross-linguistic evidence for multiple *wh*-questions, claimed that if a pair reading is obligatory, one of the *wh*-words must be in Spec,CP. On the other hand, if a single reading is available, it may be that no *wh*-word rests in Spec,CP. He noted that SC allows both pair and single readings of multiple questions and concluded that SC *wh*-words need not land in Spec,CP, and that they may remain lower. Additionally, Stjepanovic (2003), based on the ordering of focused words and adjectives, concluded that SC *wh*-words are inherently focused.

Given the discussion above, I propose the set of elementary trees in Figures 6 and 7 to derive examples (10), (11), (13) and (14). *Wh*-words may carry either focus features, [+Foc], or *wh*-features, [+Wh]. I propose that a focus EPP feature motivates the movement of non-terminal DP nodes with focus features to the specifier position of TP. Thus,Focus EPP is parallel to the *Wh*-EPP feature proposed by Frank (2002). Crucially, SC allows only a single specifier of CP, but multiple specifier positions of TP. As we take superiority to be a reflex of the A' position, *wh*-words raised to Spec TP, an A position, do not exhibit superiority effects.

The elementary trees needed to derive examples (10) and (11) are given in Figure 6. Note that the

"vidjeo" elementary tree allows two orders in which the *wh*-words may occur. The derivation proceeds with the arguments substituting in; the derived tree for example (10) is given in Figure 6. Example (12) is ruled out by the Focus EPP feature, as all *wh*-words with focus features are attracted to the specifier of TP by this EPP feature. This is similar to how in-situ *wh*-words were excluded in BG with the *Wh*-EPP feature.

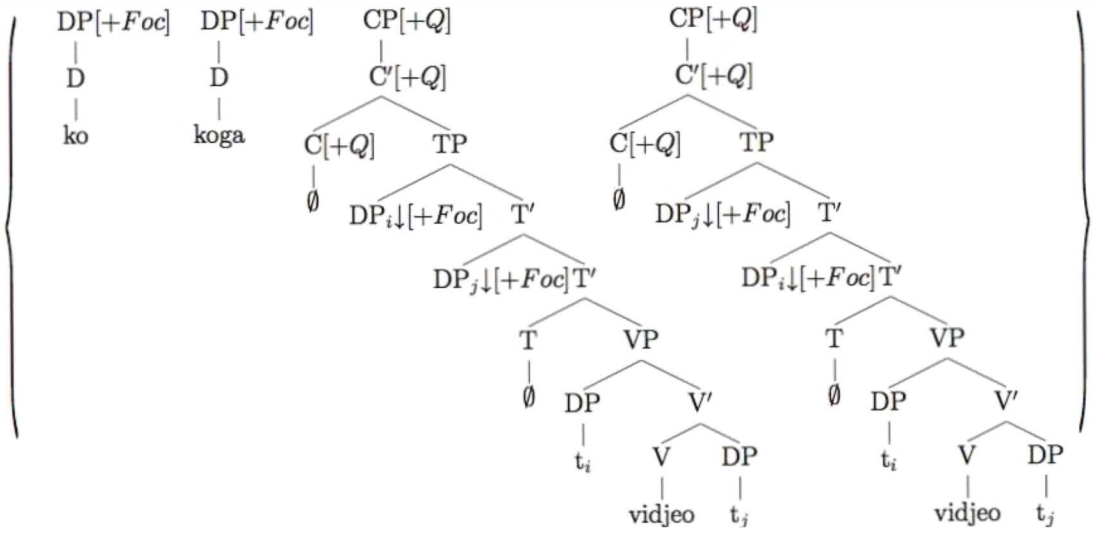

Figure 6: Elementary trees to derive examples 10 and 11

The additional elementary trees needed to derive examples (13) and (14) are given in Figure 7. Two items are to be noted here. First, the verbal trees in these examples each have one *wh*-word with focus features that has been raised to Spec,TP and one *wh*-word with *wh*-features that has been raised to Spec,CP. Because one of these positions is A' but the other is A, superiority has no effect between the *wh*-words. Second, because the embedded clause has a declarative interpretation while the entire phrase takes an interrogative interpretation, these trees contain a feature clash at the C' node. This parallels the construction of the BG elementary trees. The structure of these elementary trees predicts that SC sentences with multiple *wh*-words should not allow the *wh*-words to be separated by a complementizer. Unfortunately, I lack the data to confirm or disconfirm this prediction. Nevertheless, the derivation of (10) and (11) follows with these elementary trees and the standard TAG operations of substitution and adjoining. The derived tree for example (10) is given in Figure 9.

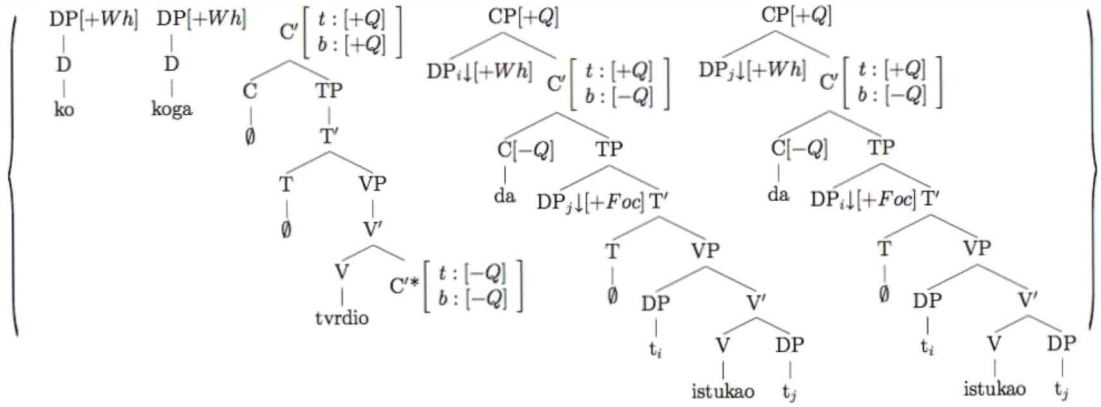

Figure 7: Additional Elementary trees to derive examples 13 and 14

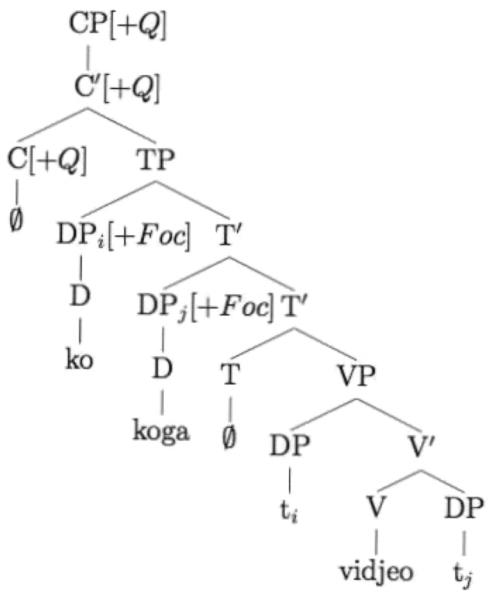

Figure 8: Derived tree for example 10

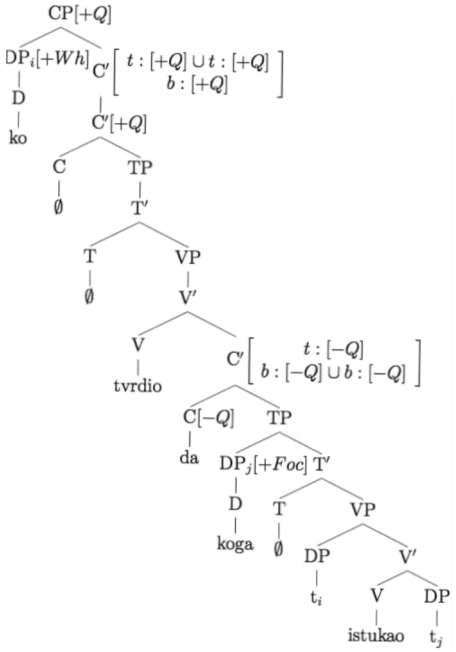

Figure 9: Derived tree for example (13)

7 Movement out of BG Wh-islands

Before concluding, I will briefly discuss movement out of BG *wh*-islands. There has been some disagreement in the literature as to the nature of movement out of these islands. Richards (1997) points out examples like (17) in which a single D-linked *wh*-word may escape a *wh*-island. Boscovic (2003) contends on the basis of excluded adjunct extraction from *wh*-islands that BG does not fail to show *wh*-island constraints entirely. Undisputed is the grammaticality of *wh*-island violation with D-linked words. My informant provided example (18) and the contrasting (19). While the fronting of one *wh*-word past a verb like "popita" is acceptable, the fronting of both *wh*-words is unacceptable.

(17) Koj kontinent te popita ucitelja koj e otkril?
which continent you asked teacher who AUX discovered
"Did you ask the teacher who discovered which continent?"

(18) Koj te popita kakvo iade?
who you asked what ate
"You asked who ate what?"

(19) *Koj kakvo te popita iade?
who what you asked ate
"You asked you ate what?"

The contrast of (19) with (3) and (6), which show that all *wh*-words must front in simple and embedded declarative BG clauses, brings us to return to the elementary trees provided in Figure 4. In (18), both the embedded clause and the matrix clause receive question interpretations, indicating that we should need an elementary tree like the "visda" tree in Figure 4. The matrix clause could then be represented by an auxiliary tree anchored by "popita" and recursive on C'. Yet there is nothing to block the adjoining of this auxiliary tree adjoin to the lower C' node to derive (19). To avoid the superficially similar (8), we made use of clashing +Q/-Q features. However, due to the interpretation of both embedded and matrix clauses being interrogative, this approach is not available. One approach is to simply stipulate that no adjoining process may occur at the lower C' node. The null adjoin (NA) constraint has been well-defined in the TAG literature (Joshi et al 1975), but this approach is unsatisfying. Another solution would be to posit that feature clash of another kind is restricting the derivation of examples like these. For example, if the CP is the domain for focus in BG, in contrast with TP being the focus domain for SC, then perhaps there is a focus clash at the higher C' node. An auxiliary tree recursive on C' could then adjoin at the higher C' node to resolve the clash. An example of such trees is given in Figure 10. This analysis predicts that the highest DP be interpreted as focused,

and that the lower DP is interpreted as unfocused. This difference could perhaps be seen in the context of paired question readings (Boskovic 2003). Stepping back for a moment, regardless of the kinds of features used in the clash, if there is a feature clash, there must be some evidence of a difference between the material above the clash and that below the clash. Also, there is the question of the theoretical status of these features. They are a different sort of feature than those that are checked off in the generation of elementary trees with Merge and Move. Yet it is not clear how or why these features are associated with individual nodes within elementary trees. It seems that the necessity for two distinct sets of features could introduce considerable redundancy into the theory, if there is overlap between the information provided by the sets of features. But if there are systematic differences between the set of features that are needed to generate elementary trees and those that are involved in feature clash and the restriction of LTAG derivations, this would constitute evidence for the partitioning of syntax into two derivational steps. These issues are left for future work.

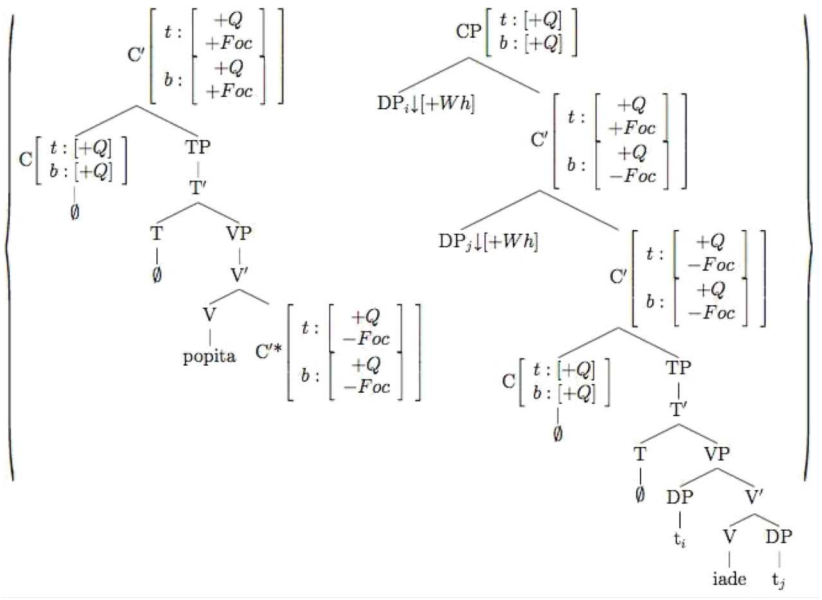

Figure 9: Elementary trees to derive 18

8 Conclusions

Expanding upon Frank (2002, 2006), the current paper accounts for *wh*-word movement in SC in simple clauses and in embedded declarative clauses. The differences between BG and SC are limited to the construction of elementary trees, specifically to differences between features and potential landing sites. Following the insights provided by Boskovic (1997, 2002), Richards (2001), and Stjepanovic (2003), additional specifiers of TP are proposed as landing sites for *wh*-words; a position to which these words are drawn by Focus EPP. Over-generation is kept in check though the use of feature clash. Feature clash was used again as a possible solution to the facts of BG *wh*-island escape, which lead to the prediction of interpretable differences between the higher and lower *wh*-words in these examples.

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Why Movement in Control[1]

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1 Introduction

Control is a relation of co-referentiality between two arguments in a given structure. Commonly, one argument occupies the matrix clause and is pronounced, determining the identity of an unpronounced argument in a subordinate clause (e.g., (1)); the symbol Δ stands for the unpronounced argument.

(1) [$_{\text{Matrix}}$ Sue $_{i}$ tried [$_{\text{Subordinate}}$ Δ_i to escape]]

Different theories of control have been proposed in the literature. One theory within the framework of Principles and Parameters that emerged in the wake of the Minimalist Program (Chomsky 1995) is the Movement Theory of Control (Hornstein 1999, 2003). According to this theory, the two co-referential arguments in a control structure are related through movement, whereby movement is understood as copy-plus-merge (Chomsky 1995). That is, sentence (1) derivationally looks like (2). *Sue* undergoes first merge in the subordinate clause before it moves to the matrix clause. At LF, both copies are available for interpretation. Decisions concerning the pronunciation/deletion of copies are made at PF. In (2), the lower copy is deleted, and the higher copy is pronounced.

(2) [$_{\text{Matrix}}$ Sue tried [$_{\text{Subordinate}}$ ~~Sue~~ to escape]]

The major premises of the movement approach are delineated in (3a-d) (Hornstein 2003: 22 (40)). Most relevant for the purpose of this paper are the premises in (3c-d) and their relation to control. These assume that movement takes place only for the purpose of feature checking. A syntactic object moves either to check its own feature or to check a feature on the target.

(3) (a) Theta roles are features and can thus trigger movement.
(b) There is no upper bound on the number of theta features that a DP can have.
(c) Movement is Greedy.
(d) Greed is understood as 'enlightened self interest', whereby an element moves to check a feature of its own or a feature of the target (Lasnik 1995).

To illustrate, observe (4), which is an expanded version of (2) above. *Sue* starts out in Spec,vP of the subordinate clause where it checks the theta-role feature of the subordinate predicate. Subsequently, it moves to Spec,IP to check the EPP feature. This is followed by movement to Spec,vP of the matrix clause where it satisfies the thematic requirements of the matrix predicate. Finally, *Sue* moves to matrix Spec,IP where it checks its case feature, and the structure converges. At PF, all but the highest copy of *Sue* are deleted. Note that every instance of movement in (4) is triggered by feature checking.

[1] In this paper I try to improve an argument I make in (Haddad 2007: 215-232). I thank Eric Potsdam, Brent Henderson, and Ann Wehmeyer for all the support and feedback. I am grateful to Karen Zagona and the audience at the 24th Northwest Linguistics Conference for their useful comments. I also thank AMIDEAST for the Fulbright Alumni Development Grant and the Winthrop-King Institute at Florida State University for the travel grant. All the Telugu data, unless otherwise specified, was collected during interviews with the following consultants: Karthik Boinapally, Mahesh Tanniru, Santhosh Kopidaka, Venicata Ramana Cheekoti, Krishna Chaitanya Nimmagadda, Sankara Sarma V. Tatiparti, Jithendra Gudapati, and Abita Gudapati. The material in this paper is based on work supported by the National Science Foundation under Grant No. BCS 0131993. Eric Potsdam and Maria Polinksy are the primary investigators. Any opinions, findings, and conclusions or recommendations expressed in this material are mine and do not necessarily reflect the views of the National Science Foundation.

(4) $[_{IP}$ Sue$^{Case/EPP}$ $[_{vP}$ ~~Sue~~$^{\theta 2}$ tried $[_{IP}$ ~~Sue~~^{EPP} to $[_{vP}$ ~~Sue~~$^{\theta 1}$ escape]

This paper presents evidence from Forward/Backward Adjunct Control in Telugu [tel], a Dravidian language, to show that movement in control is not always triggered by feature checking. As an alternative, the paper suggests that the subordinate subject moves in order to license the merge of the subordinate clause with the matrix clause. The paper is organized as follows. Section 2 presents the facts about Adjunct Control in Telugu and offers a possible derivation. Section 3 delineates some theoretical assumptions that are important for the discussion in the following sections. Section 4 shows that the movement of the subject in Telugu Adjunct Control is driven by the feature characteristics of the head of the adjunct. Section 5 extends the analysis to Sinhala [sin], an Indo-Aryan language. Section 6 is a conclusion.

2 Adjunct Control in Telugu

In the following subsections, I present the relevant Telugu Adjunct Control structures (section 2.1) and put forth a possible analysis of these structures as involving movement (section 2.2). The discussion is rather brief due to space limitation. For more details see Haddad (to appear).

2.1 The Data

Telugu is a subject pro-drop, head-final language in which *pro* and overt subjects are interchangeable (Kissock 1995). Two types of subjects are licensed in Telugu: (i) structural case marked subjects and (ii) inherent case marked subjects. The former are nominative (e.g., (5a)). The latter are licensed by psych or experiential predicates, and they are mainly dative (e.g., (5b)).[2]

(5) (a) Structural Case: Kumaar paapkaarn tinnaa-Du
Kumar.NOM popcorn ate-3.M.S
"Kumar ate popcorn."

(b) Inherent Case: Kumaar-ki jwaram waccin-di
Kumar-DAT fever.NOM came-3.N.S
"Kumar had a fever."

Like other South Asian languages, Telugu has a special type of non-finite dependent clauses know as adverbial or conjunctive participle (CNP) clauses. These function as adjuncts, expressing an action that is anterior to or simultaneous with that of the matrix clause. They do not take a complementizer, which is why they are normally considered IPs rather than CPs (Jayaseelan 2004), and the verb shows no inflection for tense or agreement.

The language has two types of CNP clauses: (i) perfective and (ii) durative. The verb of a perfective CNP clause takes the form in (6), while the verb of a durative CNP clause takes the form in (7). For the purpose of this paper, I gloss both types as CNP verbs (see Krishnamurti and Gwynn 1985, ch.18).

(6) Perfective: Verb stem + *-i*

(a) Kumaar$_i$ [$\Delta_{i/*k}$ jwaram wacc-i] haaspaTal weLLaa-Du
Kumar.NOM [Δ.DAT fever.NOM come-CNP] hospital went-3.M.S
"Having had a fever, Kumar went to hospital."

(b) Sarita-ki$_i$ [$\Delta_{i/*k}$ aa maaTa win-i] koopam waccin-di
Sarita-DAT [Δ.NOM that matter hear-CNP] anger.NOM came-3.N.S
"Having heard the news, Sarita got angry."

(7) Durative: Verb stem + *-tuu*

Kumaar$_i$ [$\Delta_{i/*k}$ bhoojanamu cees-tuu] Aarun-ki fon ceesaa-Du
Kumar.NOM [Δ.NOM dinner take-CNP] Arun-DAT phone did-3.M.S
"While Kumar was having dinner, he called Arun."

[2] Abbreviations: 3 '3rd person', ACC 'accusative', CNP 'conjunctive participle', DAT 'dative', INF 'infinitive', F 'feminine', G 'genitive', M 'masculine', N 'neuter', NOM 'nominative'. S 'singular'.

As the indices show, structures with CNP clauses do not allow disjoint subjects and are, thus, Adjunct Control structures. In other words, Adjunct Control in Telugu qualifies as obligatory subject control in the sense that the CNP subject has to take the matrix subject as an antecedent. Even with enough context, the CNP subject cannot be coreferential with any other NP in the sentence (e.g., the possessor of the matrix subject), and it cannot be coreferential with an NP selected from surrounding discourse (see Williams 1980, Hornstein 1999, Jackendoff and Culicover 2003, Polinsky and Potsdam 2004, among others). To illustrate, in (8) the CNP subject takes as an antecedent the possessor of the matrix subject *atani* 'his' or the dative NP *atani-ki* 'him-DAT'. In (9), the antecedent is selected from surrounding discourse (speaker or hearer). Both sentences are ungrammatical under the designated readings.

(8) * [**atani**$_i$ amma]$_k$ [Δ_i aakali wees-i] **atani-ki** annam peTTin-di
[his mother.NOM] [Δ.DAT hunger.NOM fall-CNP] him-DAT food put-3.N.S
Intended meaning: *"He got hungry, and his mother gave him food."*

(9) * Sarita [$\Delta_{i/k/j}$ jwaram wacc-i] naa-ku$_i$/mii-ku$_k$ mandulu iccin-di
Sarita.NOM [Δ.DAT fever.NOM come-CNP] me-DAT/you-DAT medicines gave-3.N.S
Intended meaning: *"I/You had a fever, and Sarita gave me/you medication."*

The grammatical structures in (6-7) above are instances of Forward Control. These are structures in which the matrix subject is pronounced determining the identity of the unpronounced subordinate subject. In addition to Forward Control, Telugu licenses Backward Control. In this case, the subordinate subject is pronounced, determining the identity of the unpronounced matrix subject. The sentences in (10) are examples.

(10) (a) $\Delta_{i/*k}$ [Kumaar-ki$_i$ jwaram wacc-i] haaspaTal weLLaa-Du
Δ.NOM [Kumar-DAT fever.NOM come-CNP] hospital went-3.M.S
"Having had a fever, Kumar went to hospital."

(b) $\Delta_{i/*k}$ [Sarita-ki$_i$ aa maaTa win-i] koopam waccin-di
Δ.NOM [Sarita-DAT that matter hear-CNP] anger.NOM came-3.N.S
"Having heard the news, Sarita got angry."

Like their Forward Control counterparts, Backward Control structures are instances of Obligatory Control. As the indices in (10) show, if the CNP subject fails to determine the identity of the matrix subject, the result is ungrammaticality.

2.2 The Analysis

Following Hornstein (2003) and Nunes (1995, 2004), I analyze Telugu Adjunct Control as sideward movement. This type of movement is an instance of copy-plus-merge between two unconnected structures. For example, L and M in (11) are two independent structures. X copies out of L and merges in M.

(11) [$_L$ **X**…] =COPY=> **X** =MERGE=> [$_M$ **X** […]]

Sideward movement comprises two further operations. These are Form Chain and Chain Reduction. According to Nunes, two constituents form a chain if they are (i) non-distinct (i.e., copies of the same token) and (ii) in a c-command relationship. For example, upon the merge of L and M in (12), the two non-distinct instances of X enter a c-command relation and form a chain (symbolized by the dotted arrow).

(12) [$_M$ [$_L$ **X**…] [$_M$ **X** […]]]

Chain Reduction is a PF operation. According to Nunes, if two non-distinct elements form a chain, one of them has to be deleted for the purpose of linearization. Stated differently, Chain Reduction satisfies the Linear Correspondence Axiom in (13) which dictates that an element cannot follow and precede itself, as this induces a violation of irreflexivity. This PF operation reads as (14). When applied to (12), Chain Reduction dictates that all but one instance of X be deleted. Normally, the copy that has the least unchecked features survives deletion.

(13) Linear Correspondence Axiom
Let X, Y be nonterminals and x, y terminals such that X dominates x and Y dominates y. Then if X asymmetrically c-commands Y, x precedes y. (Kayne 1994: 33)

(14) Chain Reduction
Delete the minimal number of constituents of a nontrivial chain CH that suffices for CH to be mapped into a linear order in accordance with the LCA. (Nunes 2004: 27, (44))

Following Hornstein and Nunes, we can propose that sentence (15) has the derivation in (16). In (16a), the CNP clause and the matrix clause form independently, and 'Kumar' copies out of the CNP clause. In (16b), 'Kumar' merges in the matrix clause. Subsequently, the CNP clause adjoins to matrix vP, as shown in (16c). In (16d), the matrix subject 'Kumar' moves from Spec,vP to Spec, IP to check the EPP feature. As the dotted arrows show, the copy of 'Kumar' in Spec,IP c-commands both the copy in the CNP clause and the copy in Spec,vP, forming a chain with each – thus, Form Chain. The pronunciation of all the non-distinct copies of 'Kumar' at PF induces a violation of irreflexivity and the Linear Correspondence Axiom in (13). The reason is that 'Kumar' ends up preceding and following itself. This is why the PF operation Chain Reduction applies in Step (16e). This is when the lower copy in each chain is deleted in order for the structure to be linearized.

(15) **Kumaar** [~~**Kumaar-ki**~~ jwaram wacc-i] haaspaTal weLLaa-Du
Kumar.NOM [~~Kumar-DAT~~ fever.NOM come-CNP] hospital went-3.M.S
"Having had a fever, Kumar went to the hospital."

(16) (a) i. $[_{CNP}\ [_{NP}$ **Kumaar-ki**] jwaram wacc-i] =COPY=> $[_{NP}$ **Kumaar**]
$[_{CNP}\ [_{NP}$ Kumar-DAT] fever.NOM come-CNP]
ii. $[_{Matrix\ vP}$ haaspaTal weLLaa-Du]
$[_{Matrix\ vP}$ hospital went-3.M.S]

(b) $[_{Matrix\ vP}[_{NP}$ **Kumaar**] haaspaTal weLLaa-Du]

(c) $[_{Matrix\ IP}[_{vP}[_{CNP}[_{NP}$ **Kumaar-ki**] jwaram wacc-i] $[_{vP}\ [_{NP}$ **Kumaar**] haaspaTal weLLaa-Du]]]

(d) $[_{CP}[_{Matrix\ IP}[_{NP}$**Kumaar**$][_{vP}[_{CNP}[_{NP}$**Kumaar-ki**] jwaram wacc-i$][_{vP}[_{NP}$**Kumaar**] haaspaTal weLLaa-Du]]

(e) $[_{CP}[_{Matrix\ IP}[_{NP}$**Kumaar**$][_{vP}[_{CNP}[_{NP}$~~**Kumaar-ki**~~] jwaram wacc-i$][_{vP}[_{NP}$~~**Kumaar**~~] haaspaTal weLLaa-Du]]

The outcome of (16e) above can be slightly different. As (17) illustrates, the higher copy in the chain $\{[_{NP}$ Kumaar$]^{Matrix\ IP}, [_{NP}$ Kumaar-ki$]^{CNP}\}$ may be deleted, the outcome of which is Backward Control. This suggests that the derivations of Forward and Backward Control are identical. The difference between the two is a matter of externalization contingent on the selection made by the PF operation Chain Reduction. See Potsdam 2006 for a similar analysis of control in Malagasy.

(17) $[_{CP}[_{Matrix\ IP}[_{NP}$~~**Kumaar**~~$][_{vP}[_{CNP}[_{NP}$**Kumaar-ki**] jwaram wacc-i$][_{vP}[_{NP}$~~**Kumaar**~~] haaspaTal weLLaa-Du]]

Still, the outcome in (17) is a little surprising. One would expect the higher/matrix copy to be pronounced and the lower/subordinate copy to be deleted. Why is it possible to delete the matrix copy and pronounce the CNP copy in Telugu? In Nunes's system, the lower copy is usually deleted because in most cases it has fewer checked features than the higher copy. This puts the higher copy at an advantage. When Chain Reduction applies, it picks the copy with more unchecked features (i.e., the lower copy) and the higher copy escapes deletion.

Let us have a closer look at (16d) above. As the dotted arrows indicate, at least two chains of the subject *Kumaar* are formed. The first chain is $\{[_{NP}$ Kumar$]^{Matrix\ IP}, [_{NP}$ Kumar$]^{Matrix\ vP}\}$. Out of these two copies, the higher copy in Spec,IP has an advantage of checking more features (mainly case), which is why the lower copy is deleted. The second chain is $\{[_{NP}$ Kumar$]^{Matrix\ IP}, [_{NP}$ Kumar$]^{CNP}\}$. These two copies are on equal footing as far as feature checking is concerned. Both copies have checked case, and neither copy has an uninterpretable feature that needs to be checked. When Chain Reduction applies, the operation is free to

select either copy for deletion. If Chain Reduction chooses the lower copy, Forward Control obtains. If Chain Reduction chooses the higher copy, Backward Control obtains.

If this analysis is correct, an important question follows: If the CNP subject does not have a feature to check, why does it move? This question is important because movement in the Minimalist Program is not free. It normally takes place for the purpose of feature checking. Given that in Telugu the CNP subject checks case prior to movement, it is hard to imagine why movement takes place at all.

Hornstein (1999) solves this problem by assuming that theta-roles are features and that they trigger movement. In addition, he adopts Lasnik's (1995) Enlightened Self Interest, whereby an element undergoes movement to check a feature of its own or a feature on the target. I state these assumptions in (3) above. The assumptions are not innocent, however. They are questioned on empirical grounds, posing a serious challenge for the Movement Theory of Control in general (see Bobaljik and Landau 2007). The main challenge is that the thematic requirement of the matrix predicate may be satisfied by a lexical item in the numeration (i.e., via external merge). Thus, movement (or internal merge) should be optional at best, in which case a control interpretation cannot be enforced.

Another possible solution is to adopt the standard assumption that the structural licensing of a subject NP (i.e., checking structural case) takes place only if a tensed T that is saturated by C is available. Otherwise, the subject remains active, which is why it moves to the matrix clause where it checks its structural case feature (Chomsky 2001). This approach is not without problems, however. If the CNP subject in Telugu Adjunct Control does not check its structural case feature (in this case, nominative case would be default case), it should be the easier target for deletion when Chain Reduction applies. This means that Forward Control should at least be considered superior to Backward Control, which is not true. (For a more detailed discussion, see Haddad 2007: 196-215).

As an alternative, I suggest that the CNP subject moves to the matrix clause, not to check a feature of its own or a feature on the target, but to license the merge of the CNP clause. I suggest that, although the CNP clause is propositional (i.e., a predicate with a closed subject position), the head of the CNP clause is more likely to bear a predicative feature, and I provide evidence to this effect. This feature makes it necessary that the CNP clause undergo merge as a predicate, which is only possible if the CNP subject undergoes movement. Section 4 spells out the details. First, however, I lay out some theoretical assumptions related to the merge of adjuncts and predication in section 3. In section 5, I provide evidence from Sinhala, another South Asian language, to show that if the CNP clause may merge as a proposition, no movement of the subject – and thus no control interpretation – is necessary.

3 Theoretical Assumptions

3.1 Merge of Adjuncts

Within the framework of the Minimalist Program, merge is defined as an instance of a probe-goal relation between two syntactic objects determined by the features on the heads of the probe and the goal; that is, if α and β merge, some feature F of α must probe F on β (Chomsky 2000: 132-135, Hornstein 2001: 56, Adger 2003: 91, and Pesetsky and Torrego 2006).

Whereas the above definition is true of the merge of complements, it does not automatically apply to the merge of adjuncts. Unlike complements, adjuncts do not have to meet the selectional requirements of the head they merge with (Chomsky 2004: 117). This means that adjuncts do not enter a probe-goal relation with the head of the structure they adjoin to, and accordingly they do not value features on probes.

Still, adjunction is a type of merge. Following Webelhuth (1992: 86), I assume that when properties of a syntactic object cannot be determined by selection, its behavior may be dictated by the properties of its own head. Similarly, Chomsky (2006) holds that "in order for a phrasal structure to undergo merge, its head must have a feature indicating that it can merge." Applying this assumption to the adjuncts under investigation, we may conclude that the merge of a CNP clause with the matrix clause depends solely on the characteristics of the head of the former.

3.2 Predication

For the purpose of this paper, I adopt the structural theory of predication as proposed by Rothstein (2001). According to this theory, although mapping between semantic and syntactic predicates is possible, "syntactic predication relation can be defined without reference to semantic or thematic concepts" (60-61).

For example, a pleonastic may appear in the subject position of a predicate constituent only to satisfy the Predicate Licensing Condition. This condition dictates that "every syntactic predicate must be syntactically saturated … by being linked to a non-predicate constituent, its subject" (47).

According to Rothstein, the Predicate Licensing Condition may be satisfied directly, whereby a non-predicate constituent fills the subject position of a predicate, and together they form a closed maximal constituent or a proposition. It may also be satisfied indirectly, in which case the predicate – a subordinate phrasal structure – is linked to (or predicated of) a non-predicate constituent in a higher clause.

In addition, there are two types of predicates: inherent (18a) and derived (18b) (Rothestein 2001: 58-60, (55)). Examples of inherent predicates are AP and VP. An example of derived predicates is a predicative CP. A CP is inherently non-predicative/propositional, unless an operator is inserted in Spec,CP, binding a syntactic variable inside CP, in which case it becomes predicative. For example, *for you to read* in (19), (in original (52b)), is a derived predicate.

(18) (a) Inherent predicates are maximal projections of lexical heads.
(b) Derived predicates are derived from maximal projections of functional heads by syntactic operations.

(19) I bought a book $[_{CP}$ OP_i $[_{C'}$ for $[_{IP}$ you to read $t_i]]]$.

Most crucially, Rothstein (Rothestein 2001: 58-60) holds that predicates (inherent or derived) cannot function as arguments, as (20), (in original (56-iv)), explicitly states (see also Stowell 1991). For example, sentences (21a-b), (in original (54a-b)), are ungrammatical because a derived predicate occupies an argument position.

(20) Predicates are not assigned theta-roles since these are assigned to syntactically closed maximal projections.

(21) (a) *I persuaded John $[_{CP}$ OP_i $[_{C'}$ [For John to meet $t_i]]]$.
(b) *$[_{CP}$ OP_i $[_{C'}$ [For John to meet $t_i]]]$ would seem unlikely.

In the following section, I present evidence to show that CNP clauses are syntactically predicative although they are semantically propositional.

4 CNP Clauses as Predicative

Evidence that Telugu CNP clauses are less likely to be closed predicate constituents comes from two sources. First, CNP clauses in Telugu may never take an overt complementizer, which seems to indicate that they do not project higher than IP (see Jayaseelan 2004). In other words, they are not CPs, which according to Rothstein qualify as inherently non-predicative constituents.

Further, Telugu CNP clauses may never merge as arguments (see Masica 2005: 127). Observe the sentences in (22). I take it that the NPs (or, more appropriately, DPs) in (22a-b) are arguments. The prediction is that none of these positions may be filled with a CNP clause. This prediction is borne out, as the sentences in (23) illustrate.

(22) (a) $[_{NP}$ samayaM] anTee $[_{NP}$ dhanam-e]
$[_{NP}$ time] mean $[_{NP}$ wealth-EMPH]
"Time is nothing but money."

(b) $[_{NP}$ aalaysam] anTee $[_{NP}$ naʃTam-e]
$[_{NP}$ delay] mean $[_{NP}$ loss-EMPH]
"Delay is nothing but a waste."

(23) (a) *popkorn tina-Daaniki sari-ayina samayam anTee
popcorn eating- for proper-happening time means
[cinimaa cuus-tuu(-e)]
[movie watch-CNP(-EMPH)]
"The best time to eat popcorn is while watching a movie."

(b) *kaafi taaga-Daaniki sari-ayina samayam anTee
coffee drinking-for proper-happening time mean
[pani-ki weLL-i(-e)]
[work-to go-CNP(-EMPH)]
"The best time to have coffee is before going to work."

If the CNP clauses in (23) are substituted by non-finite CP adjuncts, the result is the grammatical structures in (24).

(24) (a) popkorn tina-Daaniki sari-ayina samayam anTee
popcorn eating- for proper-happening time mean
[cinimaa cuus-tunna-appuD-e]
[movie watch-INF-while-EMPH]
"The best time to eat popcorn is while watching a movie."

(b) Sarita kaafi taaga-Daaniki sari-ayina samayam anTee
Sarita.NOM coffee drinking-for proper-happening time mean
[Kumar pani-ki weLL-ina-tarwaat-e]
[Kumar.NOM work-to go-INF-after-EMPH]
"The best time for Sarita to have coffee is after Kumar goes to work."

Let us assume that the above observations suffice to conclude that Telugu CNP clauses may not merge as closed predicate constituents. The question is: In what capacity do they merge when they adjoin to the matrix clauses of Adjunct Control structures? In section 3.1, I suggested that the merge of an adjunct depends on the feature specification of the head. Assuming that CNP clauses do not qualify as closed predicate constituents, this means that they undergo merge as open predicates.

However, evidence from Backward Control shows that the subject position of CNP clauses is filled clause-internally, which means that CNP clauses cannot be inherent predicates. Further, only lexical projections qualify as inherent predicats (see (18a)). If CNP clauses are IPs, then they are not lexical projections. Therefore, we are left with one possibility: To undergo merge as open predicates, CNP clauses must qualify as derived predicates. According to Rothstein, this is possible only if a syntactic operation converts them to open predicates (see (18b)). I suggest that the operation in this case is movement. The CNP subject moves to the matrix predicate, allowing the CNP clause to merge as an open predicate that is indirectly predicated of an element in the matrix clause.

If this approach is on the right track, at least three questions arise. First, how can a phrasal structure be a saturated predicate, yet its head is non-predicative? The answer to this question depends crucially on the main premise of the structural theory of predication as delineated in section 3.2: "Syntactic predication relation can be defined without reference to semantic or thematic concepts" (Rothstein 2001: 60). In the present analysis, this means that semantically the CNP clause can be a saturated predicate, yet syntactically it does not project a non-predicative head, namely, a CP. This idea is reminiscent of the role of D in DP. A bare NP is crucially predicative; the projection of D renders it non-predicative (Higginbotham 1987, Rothstein 2001). Szabolcsi (1994) makes a more explicit comparison between C and D, holding that they both "enable a 'proposition' to act as an argument." If the observation that arguments are necessarily non-predicative is correct, then C and D are similar in that they both are non-predicative heads.

The second question is related to the derivation as presented in section 2.2. If the subject moves to license the merge of the CNP clause, the question is: what type of movement is this? It is not Greed. It is not Attract. What is it?

Closer observation shows that this type of movement is not different from the movement that takes place to check a feature on the target, which incidentally takes place anyway. In both cases, an element moves in order to serve a purpose other than its own, resulting in the convergence of the structure. This means that one can still label this type of movement as Enlightened Self Interest. If further research proves that its use goes beyond Adjunct Control in Telugu, then adding it to the definition of Enlightened Self Interest becomes desirable. However, I will refrain from doing so here awaiting more empirical evidence.

The third question is: At what point does the CNP clause realize that it is not going to project a non-predicative CP and thus urge its subject to move? This usually happens when the numeration is exhausted. If movement happens before the numeration is exhausted, then the undesired operation Look Ahead must be involved, in which case the CNP clause foresees the problem and takes action.

Fortunately, the implementation of Look Ahead becomes unnecessary if we assume that the computational system works with subarrays of the numeration rather than with the whole numeration at once (Chomsky 2000). In this sense, the CNP clause would be assembled based on one subarray. When this subarray is exhausted, the CNP clause realizes that its head is predicative and that there are no more items at its disposal to change the situation. This is when the subject copies out of the CNP clause and becomes available in the workspace, awaiting merge in the matrix clause. Upon merging with the matrix predicate, the subject licenses the merge of the CNP clause as a predicate.

Adjunct Control into CNP clauses is not typical of Telugu. It is a feature that Telugu shares with all South Asian languages. I suggest that this type of control is derived by movement, and that movement takes place in order to license the merge of a predicative CNP clause. If this is correct, a non-trivial prediction follows: If CNP clauses in a given language of South Asia behave as non-predicative constituents, movement becomes unnecessary and control interpretation becomes optional at best. Fortunately, such a language exists. The details are in the following section.

5 Sinhala CNP Clauses as Non-Predicative

Like Telugu, Sinhala licenses Adjunct Control into CNP clauses; sentence (25) is an example (Gair et. al 1998: 275, (9a)). Notice that the CNP subject, which is obligatorily silent, has to be coreferential with the matrix subject.

(25)	mamə$_i$	[$\Delta_{i/*k}$	gedərə	gihil-la]	kææmə	kææwa
	I	[Δ	home	go-CNP]	food	ate

"I went home and ate.' Or 'Having gone home, I ate."

However, Sinhala CNP clauses have other functions that Gair (2003) describes as "unusual" and "unique" among South Asian languages. They can function as independent, matrix predicates. Sentence (26) is an example.[3]

(26)	mamə	Renu-wə	dækka	habei	dæn	æyə	gihil-la
	I	R-ACC	saw	but	now	3F.S	go-CNP

"I saw Renu but now she has gone." (From Taylor 2006: 151, (5))

In addition, CNP clauses in Sinhala may be realized in an argument position (e.g., (27)). Notice that in this case the CNP clause takes an overt complementizer.

(27)	[horek	tamange	kææmə	horəkam	kərə-la	kiyəla]	ohu	dææka
	[robber	self-GEN	food	theft	do-CNP	COMP]	he	saw

"He saw that a robber had stolen his food." (From Taylor 2006: 159, (24b))

Assuming that independent clauses are CPs and that an overt complementizer is evidence of a CP layer, we may conclude that the CNP clauses in (26) and (27) project as high as CP.[4] This is further supported by the fact that independent clauses and arguments are non-predicative, which is an inherent characteristic of CPs. This means that the CNP subject in Sinhala Adjunct Control structure does not have to move in order to license the merge of the CNP clause. The head of the CNP clause is non-predicative and it may merge with the matrix clause as a closed predicate. Therefore, unless there is another reason for the subject to move, control into Sinhala CNP clauses should be optional at best. This prediction is correct, as (28-29) show (from Gair et. al: 1998: 275-277, (9b) and (14a)). Compare (28) with (25) above.

[3] Gair et. al (1998) analyze *-la* in (26) is homonymous with the CNP marker in (25). However, Taylor (2006) provides an elegant polysemy analysis of the Sinhala *-la*, capturing the aspectual perfective meaning that characterizes it different uses.

[4] The fact that the CNP clause in (26) is an independent clause with a non-finite verb may sound bizarre. However, see Nikolaeva (2007) and works within for evidence that finiteness and main clause status are not necessarily linked and that independent clauses may be non-finite.

(28) mamə [Kalyaani gedərə gihil-la] kææmə kææwa
I [Kalyani home go-CNP] food ate
"Kalyani went home and I ate.' Or 'Kalyani having gone home, I ate."

(29) amma gaməTə gihil-la
mother village.DAT go-CNP
mamə seerəmə gedərə wæDə kərannə oonə
I.NOM all house work do necessary
"With Mother gone to the village, I have to do all the housework."

Control into CNP clauses in Sinhala obtains only when the CNP subject is unpronounced (e.g., (25) above), which makes Adjunct Control optional. One explanation is that CNP clauses in Sinhala take two forms: IPs and CPs. Only the former results with control for the same reasons I explained in the previous section.

6 Conclusion

One of the main arguments used against the Movement Theory of Control is related to the trigger for movement, or why movement takes place. Given that subordinate subjects of control structures in several languages (e.g., Icelandic) check case in the subordinate clause, it is hard to argue that movement takes place for the purpose of the structural licensing of the subject. At the same time, the assumption that the subject moves in order to satisfy the thematic requirement of the matrix predicate is contentious. In this paper, I argue that the subject moves in order to license the merge of the subordinate clause that hosts it. The virtue of this approach, if correct, is that it divorces movement in control from feature checking. Evidently, this paper is limited in scope, focusing mainly on Telugu Adjunct Control and extending the discussion to Sinhala. More research is needed to test whether the approach proposed here applies to other languages.

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Oplimalitétoque: *Largonji des Loucherbems* and Optimality Theory

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1 Introduction

Largonji des loucherbems is a French secret language which was used by butchers in the nineteenth and early twentieth centuries in La Villette, a district of Paris known for its abattoirs. It is not used much today although a few lexicalized forms such as *loufoc* for *fou* 'crazy' still survive. In its most well known form, largonji (as I will call it) involves both the transposition of sounds and the addition of nonsense syllables. The rules for construction are generally given as:

1) For any given word:
   - Move the first consonant to the end of the word
   - Replace it with 'l'
   - Add a suffix (any one of: -é, -em, -ès, -oc, -ique, -uche)

The choice of suffix is completely arbitrary and the variety of endings helps considerably in the ability of the secret language to disguise itself from uninitiated listeners. The cognizant listener knows simply to disregard all of the final syllable other than its first consonant sound. Some examples of words in largonji are given in (2) below.

2)	camion	⇒ lamioncem	'truck'
	parole	⇒ larolepes / larolepuche	'word'
	Décembre	⇒ lecembredique	'December'

Source Material

The *Répertoire du largonji*, found in the *Nouveau supplément du dictionnaire d'argot* written by Lorédan Larchey in 1889 was the only written record of any substance available for many years. It was re-published as an appendix to Marc Plénat's paper "Morphologie du Largonji des Loucherbems" in *Langages* in 1985. This is still the primary resource used in studies of largonji although in the 1980s, Françoise Mandelbaum-Reiner found some speakers and produced several papers based on her research with them.

I have not had a chance to examine Mandelbaum-Reiner's work and have relied solely on Larchey / Plénat for my source material. It is not without its problems. The original has the cited largonji forms set in capital letters, usually without accent markings. As well, Larchey used highly inconsistent spellings which makes it very difficult to know what the actual pronunciation was. All this is further compounded by very poor editing; typographic errors abound. Plénat reproduces all the defects of the original (with the appropriate warnings). I have followed the original spellings throughout but I provide phonemic representations in the tableaux to try to clarify my assumptions about the pronunciation.

Speaker Imposed constraints

The instructions for constructing words in largonji, given in (1) above, look remarkably like constraints. This gives an interesting inroad for developing an analysis of largonji in a constraint based theory like Optimality Theory. I will argue that a secret language like largonji (or other secret languages like Pig Latin) can be seen as the speaker consciously imposing new constraints on his or her language. Of course, the language specific constraints that are always present continue to influence the forms and interactions between the two sets of constraints can prove to be very interesting.

The constraints that the speaker consciously imposes can be seen as a variety of output-output constraints (Benua, 1997); the input for largonji is the output of the "mother" language (French). This means the speaker has access to all the "structural" information of the words (stress, syllabification, etc.) when forming words in largonji.

2 Largonji and Optimality

In the following analysis I am assuming, following Plénat (1985) and Bullock (1996), that the largonji suffix is actually l+[x] (-lé, -lem, -lès, -loc, -lique, -luche) and that the initial onset of the word and the initial consonant of the suffix undergo long distance metathesis. The x part of the suffix is completely arbitrary and can, in fact, be successfully substituted with any other suffix on the list (or any other suffix, for that matter) and the meaning of the word will not be affected.

The **base** is the initial output used as input (excluding the largonji suffix); the **stem** is the base excluding the largonji suffix and also any prefixes.

To produce the basic forms of largonji, as, for example, the forms given in (2) above, only one constraint is required:

3) ALL L-LEFT – Align('l', left; stem, left)

This constraint mirrors the speaker's notion that all words in largonji must start with 'l'. It requires that all l's in a word must align themselves with the left edge of the stem. If we assume that there is metathesis involved in the construction of these words, this constraint must outrank any constraint barring reordering of segments: a linearity constraint. I am adopting here M^{c}Carthy and Prince's (1995, p. 371) definition (see (4)) with S_1 being the *speaker's* input before modification and S_2 being the output after modification.

4) Linearity (LIN) – S_1 is consistent with the precedence structure of S_2, and vice versa.

The conscious reordering involved in a secret language like largonji may involve a lowering in ranking of a linearity constraint or simply a very high ranking of the constraints imposed by the speaker. In any case, ALL L-LEFT crucially outranks linearity. An example of the ranking of these constraints is shown in the tableau in (5). Linearity violations are calculated here by counting the number of positions each metathesized segment has moved from its input position.

5) camion+ lem

/kamjõ + lɛm/	ALL L-LEFT	LIN
☞ lamjõkɛm		12*
kamjõlɛm	6*!	

This Align-L constraint predicts that any l's in a word will surface as far left within the stem as possible. Further evidence of this is found in the subset of words where the base word already starts with l.

6)	laver	⇒ lalervem	'wash'
	lapin	⇒ lalinpem	'rabbit'
	liqueur	⇒ lileurquem	'liqueur'
	lacet	⇒ laletcem	'lace (eg. shoe)'
	limonade	⇒ lillonademique	'lemonade'

In these cases, the metathesis is with not the first consonant but the second. This falls out quite nicely from the constraints and ranking proposed above.

7) laver + lem

/lave + lɛm/	ALL L-LEFT	LIN
lavelɛm	5*!	
☞lalevɛm	2*	4*

Another subset of "exceptions" that works nicely with this basic constraint formulation is the following set of prefixed words.

8)	regagner	⇒ relagnergem	'to win back'
	refaire	⇒ relairefem	'to redo'
	redire	⇒ reliredem	'to repeat'
	refondre	⇒ relondrefem	'to recast/revise'
	refermer	⇒ relermerfem	'to shut again'
	entresol	⇒ entrelolsoc	'mezzanine'

I am analysing these as PREFIX + STEM + SUFFIX. In these examples, the prefix is passed over and the metathesis occurs with the initial consonant of the stem. The Align-L constraint specifies that the l's in a word must align with the left edge of the stem (the *stem* is the base excluding the largonji suffix and also any prefixes).

9) re + dire + lem

/ʀə + diʀ + lɛm/	ALL L-LEFT	LIN
ʀədiʀlɛm	4*!	
☞ ʀəliʀdɛm		8*
lədiʀɛm	2*!	14*

An added complication comes in forms such as these:

10)	régal	⇒ relalgem	'regal'
	religion	⇒ reliliongem	'religion'
	redingote	⇒ relingotedem	'frock coat'

In instances like these, there seems to be an overgeneralization of the situation seen in (9) and (10) above. Bullock (1996, p. 188), while discussing these cases, cites evidence (specifically, Steven Hannahs' dissertation, 1991) indicating that, in French, "prefixes and initial sequences that are simply homophones of prefixes are generally treated as if they are separate phonological words unlike suffixes that integrate fully with the stem." The overgeneralizations found in (10) are not, then, unexpected but consistent with the treatment of such words in French.

3 Output as Input

The description of the construction of prefixed words in the preceding section raises an important issue which must be addressed when dealing with secret languages. Speakers of these disguised forms of languages are imposing constraints on the language as they perceive it, *viz.* their "input" is the language they normally use. This means that their input has already passed through some form of construction process or, in other words, their input is an output. Consequently the speakers have at their disposal all the aspects of the language that have been "imposed" on the language; they have access to syllable structure, stress patterns and a myriad of other structures readily available on the words and sentences they are modifying.

This is evident in the preservation of onset clusters and rimes.

11)	écraser	⇒ elasecres	'to crush / to grind'
	franc	⇒ lancfrem	'franc'
	branche	⇒ lanchebrem	'branch'
	grave	⇒ lavegrem	'serious'
	fleur	⇒ leurflem	'flower'
	bloc	⇒ locblem	'block'

12) ardent ⇒ arlendé ‘ardent’
artichaut ⇒ arlichaute ‘artichoke’
argot ⇒ arlogique ‘argot’
ordinaire ⇒ orlinairedem ‘ordinary

As can be seen from the examples in (11) and (12), clusters in the initial onset position move together to the suffix-onset position while codas stay in place. There is a natural inclination on the part of the speaker to maintain the structure of both the onset and the rime; they can be separated from each other but cannot be divided. To reflect this, I will use two contiguity constraints:

13) **Onset-Contiguity** (ONSET-CONTIG) – The portion of the base onset standing in correspondence forms a contiguous string

14) **Rime-Contiguity** (RIME-CONTIG) – The portion of the base rime standing in correspondence forms a contiguous string

These are both ranked above ALL L-LEFT but not crucially ranked with regard to each other or with DEPIO (McCarthy & Prince, 1995).

15) bloc + lem

/blɔk + lɛm/	RIME-CONTIG	ONSET-CONTIG	DEPIO	ALL L-LEFT
☞lɔkblɛm				****
llɔkbɛm		*!		*
ləlɔkbɛm			*!	**

16) ardent + lé

/aʀdã + le/	RIME-CONTIG	ONSET-CONTIG	DEPIO	ALL L-LEFT
☞aʀlãde				**
aʀdãle				***!**
aldãʀe	*!			
laʀdãe			*!	

If rime contiguity takes precedence over align-L left, we would expect to find l’s in coda position preserved; and we do.

17) bordel ⇒ lordelbes ‘bordello’
cheval ⇒ levalchem ‘horse’
fidèle ⇒ lidelfem ‘faithful’

18) bordel + lès

/bɔʀdɛl + lɛs/	RIME-CONTIG	ALL L-LEFT
☞ lɔʀdɛlbɛs		5*
lɔʀlɛdbɛs	*!	3*

There are a few special cases that surface in the corpus:

19) emploi ⇒ emloipluche ‘use / job’
asperge ⇒ aslergepe ‘asparagus’
espion ⇒ elionspem / elionspuche ‘spy’
Octobre ⇒ olobrectes ‘October’

In the case of *emploi* [ã(m)plwa], the [pl] acts like a coda and the [wa] acts like a rime. This agrees with Kaye and Lowenstamm's (1984) analysis of the semi-vowel as part of a diphtongal nucleus.

Asperge and *espion* are the only examples in the entire corpus with an onset cluster that does not involve 'l' or 'r' as the second element. . I suspect that this actually follows from the above analysis but that *asperge* is blocked from becoming *alergespé* by some kind of an OCP constraint barring the [ʒs] cluster but I have avoided any analysis of the clusters formed before the suffix because of the problems with the data source; the inconsistencies in the representation make it extremely difficult to be sure of the actual pronunciations.

Octobre is the only example in the entire corpus that has a coda which moves. It does not follow from the analysis proposed and I cannot easily explain it away. A secret language is constructed on the fly and we must expect inconsistencies. It may well be that this is one such inconsitency.

4 Template Faithfulness

There is another constraint that speakers implement, as well. This is a constraint on the internal structure of a word. Take, for example, the following words:

20)	accord	⇒ alordcé	'agreement'
	écarter	⇒ elarterces	'to move apart'
	ivoire	⇒ iloirevem	'ivory'
	opéra	⇒ olerapem	'opera'

In all of these cases, the 'l' has been transposed with the first onset, not moved to the beginning of the word as the above analysis would predict — laccordé, for example. The onset / rime structure and sequence of the input$_2$ (base + suffix; what I am calling the "template") must remain intact. A simple example of a template and its preservation is given in (21)

21)	cheval + lem	⇒	levalchem	'horse'
	O R O R O R		O R O R O R	
	| | /\ | /\		| | /\ | /\	
	CVCVCCVC		CVCVCCVC	
	/ʃ ə v a l l e m/		/l ə v a l ʃ e m/	

The constraint that preserves this template is given in (22):

22) **Template Faithfulness** (TF) – All templatic elements in input$_2$ (base + suffix) have corresponding templatic elements in output$_2$

Template faithfulness must be ranked above ALL L-LEFT. (I give only the onset / rime pattern but I assume that the structure beneath remains constant, too.)

23) accord + lé

/akɔʀd + le/ RORORO	TF	ALL L-LEFT	LIN
akɔʀdle RORORO		7*!	
☞alɔʀdke RORORO		2*	8*
lakɔʀde ORORORO	*!		12*

As well, if we revisit the tableau from (16), we find that TF is co-level with the two contiguity constraints.

24) ardent + lé

/aʀdã + le/ RORORO	TF	RIME-CONTIG	ALL L-LEFT
☞aʀlãde RORORO			**
aʀdãle RORORO			***!**
aldãʀe RORORO		*!	
laʀdãe ORORORO	*!		

5 Conclusions and Problems for Future Study

The "rules" of a secret language can be likened to constraints that the speaker consciously imposed on the "mother" language. These speaker imposed constraints can, in turn, be transformed into OT constraints that interact with the existing constraints of the language to provide a theoretical analysis of the secret language.

There are some issues in the largonji corpus for which I have not been able to account. Primary among them is the issue of word internal l-onsets as in (32)

32) gobelet ⇒ lobeletgem 'tumbler / goblet'
pissenlit ⇒ lissenlitpem / lissenlitpique 'dandelion'

In the analysis proposed, we would expect that the word internal l-onsets would surface as close to the left edge as possible. Obviously, they do not and I do not have a ready explanation for this. The principle aims of the speaker are to produce a form that is simultaneously impenetrable to the uninitiated listener but easily reconstructed by those in the know. There well may be another meta-constraint on ease of reconstruction which could be used to explain the necessity for not overly complicating the base form; or it may simply be a function of input contiguity holding sway over the output-output constraints.

Another oddity is the handful of forms of the following type:

33) brebis ⇒ lebribes 'ewe'
claquer ⇒ lacleques 'to slam / to flap'
chancre ⇒ lanchecrem 'canker'
abîme ⇒ alibeme 'abyss'

In these forms, there is not a simple transposition of two consonants but a rightward shift of the entire onset sequence with the rimes remaining *in situ* – a bumper car effect. This appears to be a conflict between the constraints imposed consciously by the speaker and the "underlying" constraints of French where the underlying constraints are trying to maintain some semblance of the contiguity of the $output_1$ form while adjusting to the disguising constraints.

This paper has attempted to provide an analysis of the basic formation processes of *largonji des loucherbems* within the framework of Optimality Theory. It has also introduced some larger issues that need to be addressed when looking at language games and secret languages where speakers consciously manipulate language. Whenever we look at manipulated language we need to expect inconsistencies and contradictions; these are the expected results of our being human.

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Location-to-Location Coarticulation: A Phonetic Investigation of American Sign Language

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Abstract

This paper reports the results of a project examining long-distance coarticulation in American Sign Language. While researchers have investigated the question of how far coarticulatory effects can extend in spoken languages (e.g. Magen, 1997; West, 1999; Grosvald & Corina, in press), this issue appears to be largely unaddressed in sign language research to date (but see Cheek, 2001, and Mauk, 2003, for related work). Phonologically, signs may be characterized in terms of four basic parameters: Handshape, Location, Movement and Orientation. Here, we investigate anticipatory sign-to-sign coarticulatory influence on the Location parameter.

Preliminary analysis of the data obtained to date indicates that coarticulatory effects of one sign on another can be found as far as three signs away. Comparison of these findings with those from analogous studies on spoken language may offer insight into the similarities and differences underlying the structure of signed and spoken languages. The existence of long-distance anticipatory coarticulation also has implications for models of both sign and speech production.[1]

1 Introduction

Manual-visual languages like American Sign Language (ASL) are naturally occurring and show syntactic, morphological and phonological complexity which is comparable to that of spoken languages. Sign languages are not mime, nor is a sign language a word-for-word translation of any spoken language. Since the groundbreaking work of Stokoe (1960), much progress has been made in understanding the underlying components of sign language structure. Just as phonological segments in spoken language may be characterized in terms of parameters like place and manner of articulation or tongue height, signs may be described in terms of the four parameters Handshape, Location, Movement and Orientation. However, the extent to which analogous structural descriptions are possible between languages of the two modalities (e.g., whether there is a sign analogue of the syllable) is still debated.

The "neutral signing space" in front of the signer's body, which serves as the Location parameter value for some American Sign Language (ASL) [ase] signs, admits a number of representational possibilities (e.g. see Brentari, 1998; Sandler & Lillo-Martin, 2006). The present project begins with the premise that with respect to its position and articulatory behavior in the greater signing space, neutral space may be somewhat analogous to English schwa. Consequently, it might be particularly susceptible to the coarticulatory influence of the location of neighboring signs in the flow of signed language just as schwa, relative to other vowels, tends to show greater coarticulatory influence from neighboring vocalic segments (e.g. Fowler, 1981; Alfonso & Baer, 1982). To investigate this possibility, we have created a number of ASL sentences containing multiple consecutive signs signed in neutral space followed by "context signs" varying in their Location parameter.

A signer signs these sentences while outfitted with motion-capture sensors via which the three-dimensional coordinates of key points of the signer's body are recorded throughout the course of the signing of each sentence. Similar methods have proven fruitful in previous work on sign language phonetics (e.g. Vogler & Metaxas, 1997; Cheek, 2001; Mauk, 2003). The coarticulatory effects of the

[1] We wish to thank Orhan Orgun, Carol Fowler, Patricia Keating, Daniel Recasens and Keith Johnson for valuable feedback on the spoken-language study, and Sarah Hafer for assistance with the sign-language study. This project was supported by grant NIH-NIDCD 2R01 DC003099-7 (David P. Corina).

context signs on preceding signs with respect to Location can then be investigated. We expect, for example, that neutral-space signs preceding a context sign articulated at the forehead will tend to have a higher z-coordinate (altitude) than the same neutral-space signs preceding a context sign articulated at a lower part of the signer's body. Statistical analysis of the spatial location of these preceding signs allows us to determine to a chosen degree of confidence if and to what extent coarticulation has occurred.

Because this sign-language project was in part motivated by and patterned after a study on coarticulation in English (Grosvald & Corina, in press), we begin with a brief description of that study.

2 Spoken-language study: English

2.1 Introduction

Transconsonantal V-to-V coarticulation has been studied widely since Öhman's (1966) work on Swedish, English and Russian showed not only that such effects occur, but that their nature and extent vary among segments and languages. It can also occur across considerable distances (see West, 1999, and Heid & Hawkins, 2000, for related work). Magen (1997) analyzed [bVbəbVb] sequences produced by four English speakers and found coarticulatory effects between the first and last vowel, though not for all four speakers. The present study was designed to address the question of how far such effects can extend.

2.2 Methodology

Twenty native speakers of English (11 female) took part. Randomized lists containing six copies of each of the following sentences were used:

(1) "It's fun to look up at a car." "It's fun to look up at a key."

The final vowel, either [a] or [i], served as context vowel, while the preceding vowels in the words "a," "at," and "up," were the target vowels. These will be referred to as distance-1, -2 and -3 vowels, respectively. It was expected that the distance-1 and -2 vowels would be reduced to schwa; the vowel [^] was chosen to serve as distance-3 vowel because of its acoustic similarity to schwa. It was expected that coarticulatory influence of the context vowel [i] would result in target vowels with lower F1 and higher F2 than for target vowels in the [a] context. In order to encourage consistent prosodic patterning among these utterances, speakers were asked to say the sentences as if they were being spoken in a normal conversation in response to the question, "What's it fun to look up at?"

2.3 Results

Acoustic analysis was performed using Praat (Boersma & Weenink, 2005). First, repeated-measures ANOVAs with context vowel as factor were performed on the group dataset at each distance and for each formant. For both F1 and F2, there was a highly significant main effect of context vowel at both distance 1 (first formant: $F(1,19)=112.6$, $p<0.001$; second formant: $F(1,19)=73.5$, $p<0.001$) and distance 2 ($F(1,19)=12.8$, $p<0.01$; $F(1,19)=17.8$, $p<0.001$), indicating that for target vowels at these distances, both formants were differently influenced by the coarticulatory effects of the [a] and [i] context vowels. At distance 3, these effects appear to taper off, as the non-significant outcome for F1 ($F(1,19)=0.081$, $p=.78$) and significant but weaker outcome for F2 ($F(1,19)=4.62$, $p<0.05$) show. These results provide strong evidence of coarticulatory effects at all three distances, for at least some speakers. Next, the coarticulatory tendencies of individual speakers were examined.

For each speaker, one-tailed heteroscedastic t-tests were run for F1 and F2 for each distance condition (1, 2 or 3) to determine if formant values differed significantly between the [a] and [i] contexts. One-tailed tests were appropriate since it was predicted that [i]-colored vowels would have lower F1 and higher F2 than [a]-colored vowels. Results are shown below in Table 1. For each speaker, significance testing results of six t-tests are shown, comparing formant frequencies of that speaker's target vowels for the [a] vs. [i] contexts, for each formant and distance. Significant results are noted (*$p<0.05$, **$p<0.01$, ***$p<0.001$). Also shown, in the column at far right, is each speaker's average speech rate in segments per second from the start of the distance-3 vowel to the start of the context vowel.

Two speakers' target vowels showed context-related variation at all three distances, while some

speakers showed only weakly significant or no effects. This confirms and extends Magen's (1997) finding of high variability between speakers in the production of long-distance V-to-V coarticulation. Somewhat unexpectedly, correlation between speech rate and formant difference between [a]- and [i]-colored schwas was not found to be significant in any of the three distance conditions.

Fowler & Saltzman (1993) have suggested that "long-distance" coarticulation effects can be considered so only in terms of the number of intervening segments, in that the time span across which such effects can occur is relatively small. This may be the case, but if so, the upper limit they suggest (approx. 200-250 ms) seems low in light of the fact that the speaker who coarticulated the most in this study (Speaker 7) showed strong effects across time spans of well over 300 ms. The temporal distance between the end of his distance-3 vowels and the onset of his context vowels over all 12 of his utterances ranged from 298 to 377 ms and averaged 333 ms.

Table 1. Statistical significance of target-vowel formant frequency differences between the [a] and [i] contexts.

Speaker	Distance 1		Distance 2		Distance 3		Speech rate
	F1	F2	F1	F2	F1	F2	
1		*					13.8
2	***	***	*	*			15.5
3		***	***	***		*	13.9
4		*					11.2
5	***	***	**	**			15.2
6	***	**		*			12.7
7	***	***		***		**	15.3
8		***		**			13.6
9	**	**	*	*			12.1
10		**	**	***			15.2
11				*			11.8
12	*	***	*				14.2
13	**	***					11.0
14	***	**	*	**			12.2
15	***	**		**			17.6
16	*		*				16.5
17	***	**					12.1
18	***	***		*			12.0
19							11.2
20	**	***	*	***			14.4

3 Sign-language study: American Sign Language

3.1 Introduction

The long-distance effects seen in the spoken-language study just described have inspired us to ask whether such long-distance effects might also be found in sign language, a question that appears to be unaddressed in the literature to date, though some researchers have examined other aspects of sign-language coarticulation in ASL. These include Cheek (2001), who found different handshape-related coarticulatory effects on target signs in the context of signs articulated with "1" versus "5" handshape; and Mauk (2003), who found Location-to-Location effects of signs on neighboring signs in the context of a study of the phenomenon of undershoot.

Presented below in Figure 1 are at left, the familiar vowel quadrangle, and at right, some typical sign

locations. The sign HAT, for example, is articulated on the forehead, while the sign PANTS is articulated by both hands at waist level.[2] Shown near the middle of these respective articulatory spaces are schwa and neutral signing space; the latter is labeled "N.S." Neutral space is the area in front of the signer's body which serves as the location for many signs not articulated at particular points on the body. The arrows in the figure represent the expected direction of influence on schwa and neutral space of nearby vowels [i] and [a] in the case of schwa and of the illustrated sign locations (forehead, shoulder, waist) in the case of neutral space.

The present study is motivated by the idea that schwa and neutral space may be somewhat analogous, both in terms of their central position within their respective articulatory spaces and of their coarticulatory behavior. It is important to point out that there is *no* claim being made here that (1) neutral space is in some sense underspecified in the way some researchers have suggested schwa may be (e.g. see Browman & Goldstein, 1992; van Oostendorp, 2003), or (2) that the sign parameter Location is analogous in sign phonology to vowels in spoken-language phonology.

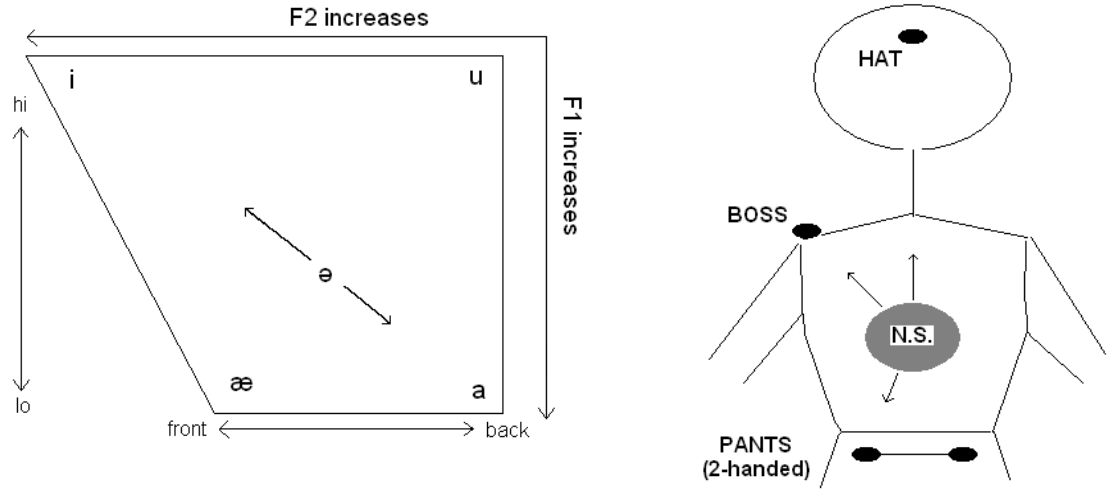

Figure 1. Position and expected coarticulatory behavior of schwa in vowel space (left) and of neutral space (labeled "N.S.") in the greater signing space.

3.2 Methodology

One female native signer of ASL took part in this pilot study. Randomized lists containing five copies of each of the following two ASL sentences, interspersed among 20 filler sentences, were used. According to the participant, without the second occurrence of the pronoun "I" the sentences would not seem natural.

(2) "I WANT GO FIND MOTHER I." "I WANT GO FIND FATHER I."

The location of the context signs MOTHER and FATHER (the chin or forehead; see Figure 2 below), served as context location, while the location of the neutral-space sign WANT was the target location, corresponding to the distance-3 condition in the spoken-language study. The sign WANT is a particularly convenient target item because its articulation includes a lowering and pulling-back movement toward the signer which is very easily spotted in the motion-capture data. The coarticulatory effects of the context signs' location on the location of the distance-1 and -2 signs FIND and GO will not be examined here.

The signs MOTHER and FATHER are a minimal sign pair, formed with the same handshape and movement, but at different positions on the body; MOTHER is articulated on the chin, while FATHER is articulated on the forehead, as indicated in Figure 2. The preceding three signs in these sentences--FIND, GO and WANT--are all articulated in neutral signing space; it is expected that when such signs are articulated in the FATHER context, they may be positioned higher on average than in the MOTHER context. The first and last sign of each sentence, I, is articulated on the chest.

[2] As is customary in the literature on sign language, glosses of ASL signs will be given in capital letters.

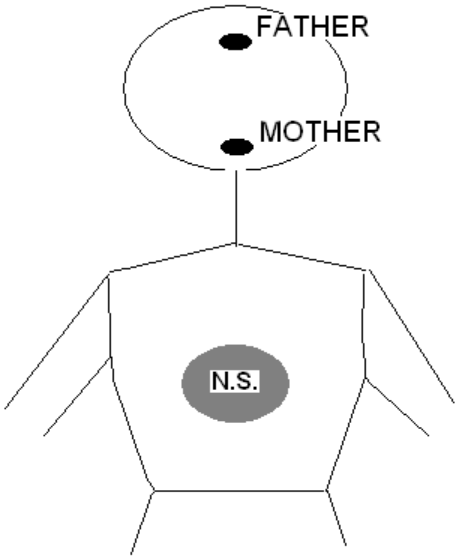

Figure 2. The locations of the signs FATHER and MOTHER relative to neutral signing space (labeled "N.S."), which is the location where the sign WANT is articulated.

The subject signed these sentences while seated, with ultrasound "markers" (emitters) attached to the back of her wrist and to the front of her neck. The ultrasound signals were detected with a set of microphones located approximately 750 cm away (Zebris system CMS-HS-L with MA-HS measuring unit; data collection performed with WinData software). This system uses triangulation to determine the position in 3D space of each marker at a given moment; this spatial information is recorded every 10 ms with 0.1 mm precision. The coordinates of the neck marker were subtracted from those of the wrist marker since absolute coordinates would tend to change if the speaker shifted her body position, while relativized coordinates should be more stable.

3.3 Results

Figure 3 below shows the z-coordinate (altitude) of the signer's wrist during the articulation of four sentences. Time is shown along the horizontal axis; successive labels are 1 s apart. The first and last sentences have context words MOTHER and FATHER respectively (the two intervening filler sentences had other context signs not discussed here). The overall up-then-down pattern of each sentence reflects the movement of the signer's hand, first from the lap to the chest (for the sign I) and neutral space region (WANT GO FIND), then to its highest point on the chin or forehead (for MOTHER or FATHER), and finally back down to the chest area for I and then to the subject's lap.

The two arrows pointing toward the small zigzags near the start of each of those two sentences indicate the local minimum defining the sign WANT, which is articulated with both hands facing palms-up in neutral space making a slight pulling motion down and toward the signer. It is the z-coordinate at this local minimum that will be compared between contexts; it is expected that in general, it will have a greater value in sentences whose context signs are located higher on the subject's body, as is seen to be the case in the instantiations of the MOTHER and FATHER sentences shown in Figure 3.

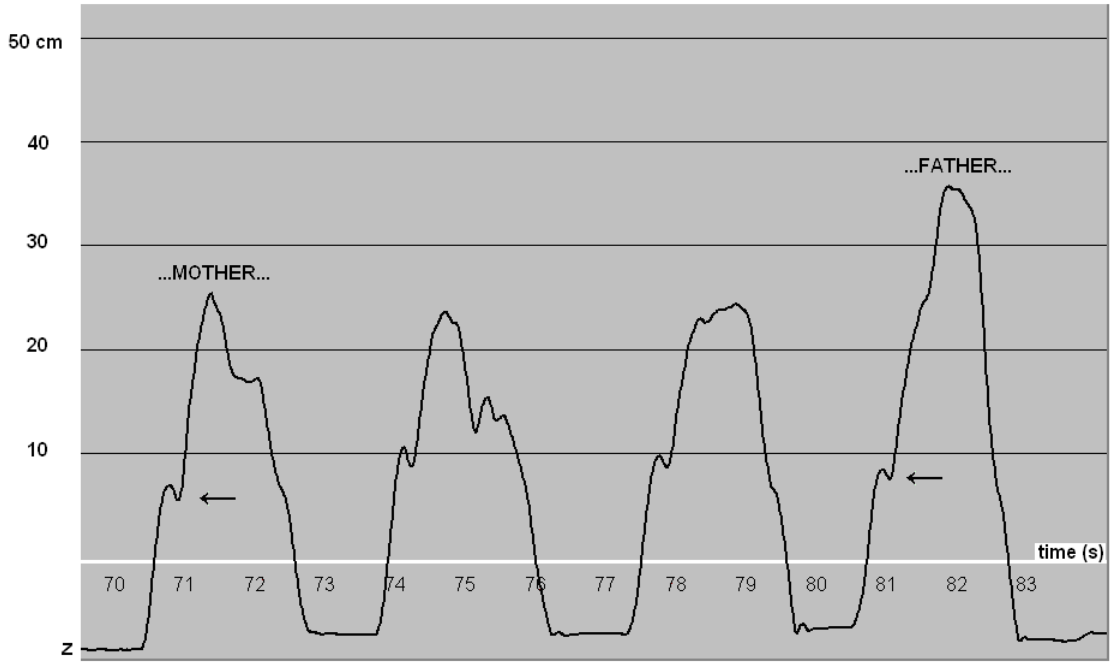

Figure 3. The z-position (height in cm) of the signer's wrist during the articulation of four ASL sentences.

Table 2 below gives the average z-value of the local minimum defining the sign WANT in the contexts MOTHER and FATHER, together with the significance testing outcome using a paired t-test. Paired t-testing was done to guard against the possibility that neutral signing space might drift slightly over the course of the experiment, being more similar for adjacent or near-adjacent sentences. Therefore, the pairings were made between z-values for WANT in the first MOTHER and FATHER sentences, in the second such pair, and so on through the fifth.

Also shown in Table 2 are results for two other context word pairs. The signs RUSSIA and DEER are another minimal pair, differing only in location; RUSSIA is articulated at the waist, while DEER is articulated at the forehead. The signs PANTS and HAT are not a minimal pair, but their locations are spread apart like those of RUSSIA and DEER, being articulated at the upper thighs and forehead, respectively.

Table 2. Average z-value (height) of the sign WANT in various contexts, with results of significance testing between context pairs also given.

Context	Average z value (cm)	Significance test result
MOTHER (chin)	7.12	p=0.005
FATHER (forehead)	8.65	
PANTS (thigh)	15.97	p=0.102
HAT (forehead)	17.06	
RUSSIA (waist)	15.43	p=0.104
DEER (head)	16.74	

For all three context pairs, the averages differ in the expected direction, with a half-centimeter difference for MOTHER and FATHER and a greater than one-centimeter difference for each of the other pairs. Only the outcome for the first pair reaches significance, though both of the other pairs do show a nearly-significant result.

Pilot testing for other context word pairs differing in their x- and y-coordinates (left-right and front-back dimensions, respectively) is also underway. Preliminary analysis indicates that effects at least as strong as those reported here for height are the norm for side-to-side and front-to-back location coarticulation as well.

4 General discussion

A number of models of coarticulation have emerged in the last three or four decades, two of the most dominant being "coproduction" models like Fowler's (1983) and the Window model of Keating (1990). A key prediction of a coproduction-based model is that since each gesture's duration is limited, its temporal range of influence on its neighbors should have a low upper bound. As was noted earlier, long-distance production results like those seen in the spoken-language study appear inconsistent with this last assertion, and seem problematic for any model of coarticulation not allowing for considerable range of influence of segments on one another. Similarly, if long-distance signing effects like those seen here can be replicated in further research, they would have to be recognized in any viable model of sign production.

It is interesting to note that while the upper temporal bound of V-to-V coarticulation seen here for the speakers who coarticulated the most is on the order of 350-500 ms (depending on how this quantity is defined), the corresponding temporal distances for the sign data obtained to date were significantly greater, on the order 500-800 ms. While on the one hand, this might be expected given the difference in mass of the articulators between the two modalities, the fact that the articulation of signs is slower than that of speech, and so on, such differences also indicate that the limits of language production planning in general--the temporal horizon, so to speak--might not expressed strictly in time units like milliseconds, but may instead be determined in relation to the number of gestures in a given timeframe via some function of "gestural density." More such cross-modality studies will be needed to clarify this important issue.

As part of our ongoing work, we are also investigating the perceptibility of coarticulatory effects. In a follow-up to the spoken-language production study described here, we performed a perception study with 20 participants and found that even distance-3 V-to-V coarticulatory effects were perceptible to some listeners (Grosvald & Corina, in press). As was the case with production, a great deal of between-subject variability was seen. After we have collected production data from more signers, we plan to do a similar follow-up study with sign stimuli to learn to what extent Location-to-Location effects may also be perceptible.

Flemming (1997) mentions V-to-V coarticulation in a discussion in which he argues that phonological representations by necessity contain more phonetic information than has traditionally been assumed; his goal is a "unified account of coarticulation and assimilation." Since it seems that coarticulatory effects at various distances are often perceptible, a complete account of this phenomenon may prove to be a difficult undertaking indeed, given the variation we see among language users in the production and perception of coarticulation.

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The Distribution of Reflexive Pronouns in English - A Corpus Analysis

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1 Introduction

The question of denfining the proper environment for reflexive pronouns in English is not a new one to syntactic theory. Going back as far as the early roots of Generative Grammar, there has been a gradual evolution in this field. Moving from the transformational story where an instance of a full nominal would be transformed into a reflexive in the right environment onto the more familiar analysis where reflexives are base-generated, but require an antecedent, there has been a pervasive understanding that reflexives are only licit within a certain domain with respect to their antecedents. Initially, this was conceived of as the clause, but evidence from constructions such as picture noun phrases refined this down to including some noun phrases as well as the clause. Throughout this evolution, the basic rhetorical pattern has been the same: the core clausemate conditions are identified, along with other argument position constructions, and particular examples which have challenged previous work, such as the picture noun phrases, are addressed. Any left-over cases are generally dismissed as somehow exempt to the proposed theory and quietly swept under the rug.

In this paper, I will first look at two competing approaches to the distribution of reflexives, discussing how much they manage to capture, and what data they ignore. I then present a corpus analysis of English reflexives, attempting to determine which of these two approaches comes closest to reflecting the actual distribution found in naturally occurring data. Through this process, the various uses of reflexive pronouns in English will be categorised, and potential ambiguities identified. The paper concludes with a summary of the findings and avenues for future work.

2 Two Views on Reflexives

Two competing views on defining the distribution of reflexive pronouns in English can be identified. The first is arguably the most widely-known account in the literature, the Chomskyan account based upon Condition A. The second is a more semantic approach based in Reinhart and Reuland (1993). In this section, I briefly consider each of these approaches.

2.1 The Chomskyan Approach

The Chomskyan approach to the distribution of reflexive pronouns is rooted in the Chomsky (1981) Condition A:

(1) An anaphor must be bound in its governing category.

Setting aside the somewhat inaccurate use of the term ‘anaphor’, this actually breaks down into two stipulations: a structural condition, and a locality constraint. The first of these, the notion of binding, essentially boils down to a requirement that a reflexive have a c-commanding antecedent. The second part delimits the distance between the reflexive and that antecedent, generally either within the same clause, or noun phrase with a specifier.

This approach makes no specific reference to the function of the reflexive pronoun in the sentence. As such, reflexive pronouns that are not in argument positions are just as equally handled by this account as those core cases where the reflexive is in an A position. Where this analysis is challenged is when it comes to cases of reflexivity which lack a reflexive pronoun:

(2) Leonard washed.

In (2), there is a reflexive reading available where Leonard washed himself, but this meaning is expressed

without any overt expression of the predicate's theme. As such, Condition A does not say anything about reflexivity as a semantic phenomenon, but merely defines the available positions for reflexive pronouns.

2.2 Reinhart and Reuland

In contrast to the Chomskyan approach is that of Reinhart and Reuland (1993). Instead of Condition A, they define two Principles:

- Principle A: A reflexive-marked syntactic predicate is reflexive.
- Principle B: A reflexive semantic predicate is reflexive-marked.

In order to fully grasp Reinhart and Reuland's Principles, some terminological clarification is in order. First of all, reflexive-marking can be realised in one of two ways according to their formulation. This can be either via an inherent reflexivity of the predicate (at the lexical level), or by having a SELF anaphor (reflexive pronoun) as one of the arguments. Syntactic predicates are defined as those which have an external argument, along with all arguments which receive a θ-role, whereas semantic predicates refer merely to the predicate and all its arguments at the relevant semantic level. By taking this approach, reflexivity is not necessarily connected to syntactic structure, but gives more emphasis to the underlying semantic form. Crucially, the definition of reflexive-marking captures a broader range of data than just Condition A, which only makes reference to reflexive pronouns. Under this analysis, the case of the inherent lexical reflexive from (2) will be captured as being related to a sentence containing an overt reflexive pronoun. However, Reinhart and Reuland are also more limited in that they are only concerned with elements appearing in argument positions, whereas Chomsky's Conditions apply in all syntactic positions.

The Principles can be illustrated first by considering the simple case of (3):

(3) Monty hurt himself.

Principle A first looks for a syntactic predicate; because there is an external argument to the sentence, this example qualifies. Furthermore, the reflexive pronoun contributes reflexive-marking. Principle A is satisfied by the fact that both arguments of the predicate are coindexed. Principle B operates from the semantic level, recognising a situation in which there are two co-indexed arguments of the same predicate, and checking for reflexive marking.

Reinhart and Reuland's Principles also capture some facts which elude Chomsky's conditions:

(4) a. There were five tourists in the room apart from myself.
b. She gave both Brenda and myself a dirty look.

For Chomsky, these appear to be Condition A violations, as there is no c-commanding first-person antecedent for either of these instances of *myself*. Dealing first with (4a), both of Reinhart and Reuland's Principles are easily satisfied: this may be a syntactic predicate, but it is not reflexive-marked, as there is no reflexive pronoun in any of its A-positions. Similarly, this is not a reflexive predicate at the semantic level, so Principle B is silent. In (4b), the reasoning runs in exactly the same way, capitalising on the observation that the theme of this predicate is actually a conjunction, and therefore does not count as being either reflexive or reflexive marked. In both cases, there are no violations of the constraints, so the grammaticality of the sentences is correctly predicted.

It is also worth noting that in both sentences, a pronoun would be equally applicable:

(5) a. There were five tourists in the room apart from me.
b. She gave both Brenda and me a dirty look.

This replacement exemplifies a diagnostic for logophoricity proposed by Reinhart and Reuland: “whenever a logophor is possible, a pronoun is just as possible.” (Reinhart and Reuland 1993, p.684). While this does not imply that anything which can be replaced by a pronoun must be a logophor, it does state that all logophors are replaceable by pronouns. This in turn means that any reflexive pronoun which cannot be replaced by a referential pronoun must not be a logophor. This reasoning forms the basis of Reinhart and Reuland's definition of *logophor*, another term which has multiple definitions in the wider literature. The definition being used here is synonymous with “exempt anaphor” which essentially refers to any reflexive

pronoun which is acceptable despite not conforming to Condition A.

By not considering non-argument reflexives within their theory, Reinhart and Reuland escape one of the perennial challenges to the Chomskyan theory: dealing with exempt anaphors. However, this comes with a caveat in that they only exempt those reflexives which can be replaced by a referential pronoun. As it seems clear at this point that both approaches will account for slightly different sets of data, one means of evaluating which is the better to adopt will be to determine which data pattern is more representative of the natural language. This can be accomplished using a corpus of reflexive pronouns.

3 Defining a Corpus

For this project, the Treebank 3 (Marcus et al. 1999) corpus was used. Specifically, samples from two different sections of Treebank 3 were analysed. First, the entire Wall Street Journal (WSJ) corpus, amounting to 1,000,000 words of printed text was analysed. This analysis was then repeated using a portion of the Switchboard (SWB) corpus. Switchboard consists of approximately 3,000,000 words of text, transcribed from five minute telephone conversations held between strangers and moderated by an automated computer system. Here, a 545 conversation subset was used, amounting to roughly one-third of the overall corpus, to achieve an even word count with the WSJ corpus.

3.1 Extraction

For both corpora, perl scripts were written to automatically extract reflexive pronouns. Due to the structure of the corpus data, a slightly different method was used in each case. For the WSJ corpus, extraction took place at the sentence level. For SWB, entire conversational turns were extracted, so long as there was at least one instance of a reflexive pronoun somewhere in that turn. In some cases, there were extracts (sentences or turns) which contained more than one reflexive pronoun; each pronoun was considered a separate token for the analysis. Seven instances of the phrase *do-it-yourself* (as in "do-it-yourself furniture assembly") were eliminated from the analysis, taken to be frozen complex expressions rather than spontaneous uses of reflexive pronouns. In total, this yielded a total of 496 tokens from the WSJ corpus and 575 from the SWB. These were annotated for such variables as φ -features, θ -role, and associated predicate. Additionally, a set of functional categories for the reflexive pronouns was defined, and used as the basis for further analysis. Those categories are defined in the next section.

3.2 Categorisation

In all, there were ten distinct categories of reflexive use defined in this study. Each will be discussed in turn, along with an illustrative example from the corpus itself. In some cases, these categories were defined at the beginning of the study. Some of the classifications evolved through the course of the analysis. The categories defined here, along with the criteria for inclusion, were applied to the corpus as a whole on a final pass through the data.

The first category is, not surprisingly, the 'canonical' one, where the reflexive pronoun appears in an argument position, having the same reference as one of its coarguments:

(6) ...because the government has not converted **itself** into a modern, democratic, 'developed nation' mode of operation. (wsj_1120: 2)

Closely related to these cases are those where the reflexive is again in an argument position, but of a bi-clausal structure. This category covered cases of ECM, control, and raising:

(7) See I do that to make **myself** go to sleep at night. (SW2078.DFF: A.213)

This category included cases where there would be a covert element, such as PRO acting as an antecedent. As such, some of these could have been considered co-argument cases as well, but due to the added complexity of the structure, and the seeming long-distance nature of the relation, they were left in the bi-clausal group.

The next category was the picture noun phrases. Sentences placed into this category fit the basic schema of containing a noun phrase wherein the reflexive was the complement of some representational noun:

(8) ...people whose ignorance and intellectual incompetence is matched only by [their good opinion of **themselves**]. (wsj_1286.mrg: 10)

As shown in this example, this class is not strictly limited to pictures *per se*, but any noun phrases of similar structure. In order to fit into this category, the antecedent did not have to be local to the NP as a specifier, but the presence or absence of the local antecedent was noted.

The other major exception to the standard binding theory, exempt anaphora, was also categorised:

(9) And, uh, a great disappointment for some people like **myself**. (SW2379.DFF: B.16)

In order for tokens to be placed in this category, a replacement test was used. Only those reflexives which could be felicitously replaced with a φ-feature equivalent referential pronoun were included. Similarly, reflexives for which this test failed were placed into some other category; none of the other reflexives in the study are thus considered exempt.

One category which did not emerge until after the analysis was begun was the appositive case:

(10) The classroom **itself** operated on the periphery of this awful system... (wsj_1315.mrg: 30)

Here, the reflexive is not contributing any new content to the sentence, it is merely putting additional emphasis on its antecedent. This use of the reflexive has two forms. There is either the canonical usage shown above, or the reflexive can appear at the end of the sentence. This phenomenon will be discussed in more detail alongside the overall findings.

Another category which emerged through the course of the analysis was that of the manner adjuncts:

(11) ...find an indoor pool where either you can do this by **yourself**... (SW2382.DFF: B.32)

In this case, the reflexive appears in a *by*-phrase, adding information to the manner in which the action took place. Specifically, it adds that the action was carried out alone. As with the appositive case, there is an additional form for this usage as well, in which the *by* preposition is elided.

Classified separately were cases of other prepositional phrase modifiers containing reflexives:

(12) Many of the affluent aren't comfortable with **themselves**. (wsj_2366.mrg: 43)

Some of these cases had close to argument status, occasionally representing a beneficiary. Crucially, this category did not include cases where the sentence's meaning would be changed if the reflexive were replaced with a pronoun. In the case of the given example, the referent for the people with whom the affluent are not comfortable would necessarily change if *themselves* were changed to *them*.

Considered separately were those cases where the PP modifier was modofying a nominal:

(13) ...gives you some space for **yourself**... (SW2072.DFF: B.46)

Here, the PP is modifying the nominal *space* rather than the predicate.

Another category involved cases where the reflexive was in a copular complement:

(14) I am beside **myself** (wsj_0403.mrg: 5)

As in the other cases, tokens were only placed in this category if they did not pass the test for exemption.

Two final categories were created to account for cases which did not fit into any of the other categories. The first of these was for cases which appeared to be dysfluent uses of a reflexive:

(15) Do **youself** have children wi-, who are or have been through the public school system? (SW2828.DFF: B.13)

While this sentence is improved by the replacement of the reflexive by a pronoun, this does not strictly fit

into the exempt case. The exempt cases are still considered to be grammatical with the reflexive merely being a matter of stylistic choice. Here, the native speaker intuition is that there is something wrong with the sentence. Finally, there was an 'other' category for cases which did not fit any of the above criteria. These however turned out to be quite exceptional:

(16) a. ...all the firm has to do is "position **ourselves** more in the deal flow..." (wsj_0604.mrg: 38)
b. ...always try to stump Jesus, try to give him something that would contradict **himself**. (SW2260.DFF: B.44)

In the first of these examples, from the written corpus, the reflexive does not strictly speaking have an antecedent, but because the reflexive appears in a direct quotation, it can be assumed that in the original context there was a proper antecedent. The second case is more difficult to diagnose, though it is not as strikingly ungrammatical as the sentence in (15). Perhaps there is an ellipsis at work here, concealing structure above the *contradict* clause which would render the sentence easier to parse.

4 Findings

The overall percentage of reflexives falling into each category was tallied with respect to both the written and spoken corpora. The general results are first presented, followed by a more detailed discussion of one difficult aspect of the classification. This section concludes with a comparison of some of the patterns found between genres.

4.1 Counts by Corpus

The counts for each corpus are summarised in Table 1. Looking at the first two categories, the Coraguments and the Bi-Clausal cases, combining them yields the total number of tokens wherein the reflexive appeared in an argument position. What is immediately striking about this is the fact that it amounts to only 60% of the occurrences in the written corpus, and just over half the time in the spoken corpus. This poses a clear challenge to the Reinhart and Reuland approach to binding, in that it makes clear that close to half of the uses of reflexive pronouns in English will not be able to be accounted for using a purely predicate-based analysis of their distribution.

Looking next at the more widely-discussed counter-examples, there is again an unexpected finding. Across both corpora, with a total of 1071 tokens, there were only five instances of reflexives within a picture noun phrase. Of these, only two were actually bound locally within the NP. Similarly, there were only twenty-two instances of exempt anaphors, under the criteria laid out above. Again, this is a somewhat unexpectedly low number. Given the amount of attention these types of examples receive in the general literature, one would expect them to occur more frequently. Instead, the results here suggest that these are somewhat rare phenomena.

After the A-positions, what emerge to be the most common uses of the reflexives are the appositives and manner adjuncts. While in both cases, the appositives are more numerous than the manner adjuncts, their distributional patterns between the spoken and written corpora are opposite. The appositives are more frequent in the written corpus, while the manner adjuncts are more frequent in the spoken, by a much wider margin. The remaining categories were relatively infrequent. Out of all this, the most unexpected finding was the prevalence of the appositives and manner adjuncts. Furthermore, these proved to be among the hardest to classify, due to the existence of alternate forms for each. It is to this issue which I now turn.

4.2 Distinguishing Appositives and Manner Adjuncts

As noted above, both the manner adjuncts and the appositives have 'canonical' and 'derived' forms. For the appositives, this entails extraposition to the end of the sentence:

	WSJ		**SWB**	
	Tokens	%	Tokens	%
Coarguments	241	48.59	216	37.57

Bi-Clausal	64	12.90	77	13.39
Picture NP	4	0.60	1	0.17
Exempt Anaphor	1	0.20	21	3.65
Appositive	142	28.63	121	21.04
Manner Adjunct	21	4.23	96	16.70
Other Prepositional Adjunct	13	2.62	23	4.00
Nominal Adjunct	7	1.41	12	2.09
Copular Complement	2	0.40	3	0.52
Dysfluent	0	0.00	3	0.52
Other	1	0.20	2	0.35
TOTAL	496		575	

Table 1: Distribution of reflexives across WSJ and SWB Corpora

(17) a. ...the chief executive **himself** now pays 20% of the cost... (wsj_1629.mrg: 19)
b. I don't like to run **myself**. (SW2893.DFF: A.113)

This extraposition analysis, proposed by Bickerton (1987), straightforwardly postposes the reflexive to the end of the sentence, leaving behind a trace in the original position. This predicts that it should not be possible to have the appositive repeated in both positions in the same sentence:

(18) a. Yeah, I used to be in D.S.E.G. **myself**. (SW2638.DFF: B.38)
b. *Yeah, I **myself** used to be in D.S.E.G. **myself**

As shown by this simple duplication test, the appositive cannot appear twice in the sentence.

For the manner adjuncts, the derived form entails elision of the *by* which heads the adjunct PP. Given that these adjuncts are generally sentence final, eliding the *by* creates a sentence which is of exactly the same form as that with the extraposed appositive: a sentence with an otherwise bare non-argument reflexive sentence-finally:

(19) a. ...you can do that by **yourself**... (SW2382.DFF: A.29)
b. So I'm just doing it all **myself**. (SW2692.DFF: A.39)

Upon encountering such sentences as (19b) in the corpora, the unavailability of a duplicate appositive was employed as a test. If a sentence with the bare final non-argument reflexive was also able to support an appositive immediately following the antecedent, then that sentence was placed into the manner adjunct category. Sentences such as this sound unnatural to native speakers, but the provision of a context makes the distinct readings of the reflexives clearer:

(20) John **himself** painted the house **himself**. (But he suggested that others should hire painters.)

Still, the judgements for sentences of this type are subtle. Another useful predictor in disambiguating the ambiguous cases was the verb. The manner adjuncts tended to occur with agentive verbs, whereas non-agentive verbs were more likely to have an appositive. To validate this means of disambiguation, and solidify the connection between these non-argument reflexives and their associated verbal predicates, a separate psycholinguistic study was carried out, reported in Storoshenko (*to appear*). The findings support the claims made here, validating the use of this duplication test as a means of sorting the ambiguous cases.

4.3 Genre Effects

The text genre also had an impact upon the manner adjuncts and appositives. In addition to the already-noted change in overall frequency for these two categories between the written and spoken corpora, there was also a marked difference in the frequency of the canonical versus derived forms. As shown in Table 2 the vast majority of the appositives in the written corpus appeared in their base-generated positions. In the spoken corpus, there was a smaller difference, with the extraposed variant being the more common. Similarly for the manner adjuncts, cases with the *by* phrase were more common in the written corpus, whereas in the spoken corpus it was more common to use the ambiguous form. This suggests that intonation may also play a role in disambiguating the cases where there is a sentence-final non-argument reflexive. Given that the use of these ambiguous reflexives increases in a spoken genre, it is possible that having access to intonation, as well as the string order, makes it clearer which role the reflexive is filling: manner adjunct or appositive.

	WSJ		**SWB**	
	Tokens	%	Tokens	%
Appositive				
Base Generated	111	78.17	54	44.63
Displaced	31	21.83	67	55.37
TOTAL	142		121	
Manner Adjunct				
with *by*	13	61.90	37	38.54
without *by*	8	38.10	59	61.46
TOTAL	21		96	

Table 2: Forms of Appositives and Manner Adjuncts Across WSJ and SWB Corpora

	WSJ		**SWB**	
	Tokens	%	Tokens	%
1st	111	78.17	54	44.63
2nd	31	21.83	67	55.37
3rd	142		121	

Table 3: Person Features of reflexives Across WSJ and SWB Corpora

The other most striking difference in distribution between the two corpora came with the exempt anaphors. In the written corpus, only one was found, whereas there were twenty-one in the spoken. Firstly, it is worth noting that in all the cases from the spoken corpus, the exempt anaphor was first or second person. Secondly, seven out of those twenty-one exempt anaphors were carried in direct requests for information:

(21) How about yourself? (SW2024.DFF: B.12)

To understand this phenomenon, one must first recall the nature of the corpus. The Switchboard corpus was

collected using an automated computer system which connected strangers by telephone, and assigned a topic of conversation to be recorded. Because these were short telephone conversations, generally no longer than five minutes, there is little time for the interlocutors to reach a level of close familiarity. As such, the reflexive in these cases may be acting as a politeness form, moderating what would otherwise be a fairly direct question being asked between strangers.

This leads into the last major difference between the two corpora: person features. Table 3 shows the distribution of person features across the two corpora. In the written corpus, over 90% of the reflexives were third person. On the spoken side, the third person reflexives are still the most numerous, but they make up less than half of the total. Given that these were conversations, it is again not surprising that first and second person reflexives are more common in the Switchboard corpus. What this may suggest for binding theory is that where indexical information about the speaker and addressee is available, these may need to be encoded as potential antecedents for reflexives.

5 Conclusions and Future Work

Returning to the original question of whether corpus data can shed some light on which line of analysis might be better to pursue in the study of reflexives, the answer is undoubtedly yes. However, the final result is somewhat mixed. In demonstrating that the core use of the reflexive pronouns in English is for cases of A-position reflexivity, there is support for the position that a predicate-based approach is warranted. The prevalence of the other uses though calls this into question, especially given that the two most common other uses, the manner adjunct and the appositive, do not appear in argument positions. Furthermore, these do seem to require a locally c-commanding antecedent, suggesting that syntactic structure still has a role to play in the final analysis. Finally, the fact that these particular uses cannot be replaced by a referential pronoun prevents their dismissal as exempt anaphors; they must be included in a full theoretical account.

For this to take place though, a more detailed account of the manner adjunct and appositive cases is called for. As mentioned earlier, the manner adjuncts in particular were sensitive to the agentivity of the predicate they modified. So while syntactic structure has a role to play, so too, it would seem does semantics. In this connection of a *by*-phrase to agentivity, a parallel can be drawn to the passive, though a formalisation of this remains for future work.

Similarly, more investigations need to be carried out upon the full nature of the appositive. While the corpus results suggest that this is a fairly robust phenomenon in the language, there do appear to be constraints on its usage, as well as on the extraposition operation:

(22) a. Marlena handed Jim himself the tablet.
b. *Marlena handed Jim the tablet himself.

The first example in (22) may sound somewhat odd, but given a suitable context should be felicitous. The second sentence, which should be derivable by extraposition, is unacceptable. This hints at the possibility of being able to determine a more structured account for the appositive, defining domains where it does or does not obtain, but it also held over for future work.

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The Implications of Specificity in Turkish for the Givenness Hierarchy

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1 Introduction

This study proposes an alternative account to the widely discussed phenomenon of the nature of specificity in Turkish [tur] with respect to its relation to accusative case. In the literature, accusative case in Turkish has been considered to be a marker of specificity, which can appear only on nouns which have been introduced earlier in the discourse (Erguvanlı (1984), Enç (1991), Kelepir (2001) and Öztürk (2005), among others). Based on Turkish data where accusative case can appear on nouns which are not necessarily available in the discourse, this paper will argue that whether any given accusative marked Noun Phrase (NP, henceforth) is necessarily specific or not can be accounted for by the Givenness Hierarchy (GH) proposed by Gundel, Hedberg and Zacharski (GHZ, 1993) and developed in the subsequent work (GHZ, 2001, 2004). The discussion here will be that the exact status of an accusative marked NP in Turkish can be explained if we assume that it only requires for an NP to be referential by the hearer rather than being obligatorily D-linked[1] or previously established in the immediate discourse.

Section 2 provides a background for the relationship between case morphology and specificity in Turkish. In this section it will also be shown that it is not the case that accusativity always obligatorily indicates specificity in Turkish. Furthermore, it is argued here that not all non-accusative marked NPs are obligatorily interpreted as non-specific entities. Section 3 introduces the Givenness Hierarchy and shows how it predicts the use of certain expressions which constraint possible interpretations of nominals by signaling different cognitive statuses. In section 4 it is argued that the use of accusative case marked NPs is accounted for by the Givenness Hierarchy. Section 5 concludes the paper.

2 Background: The Interaction between Case Morphology and Specificity

The interaction between case morphology and specificity as well as definiteness has been investigated in those languages such as Turkish in which there is no morphological determiner (i.e. no definite article). For instance, the earlier studies go back as old as Erguvanlı (1984) and Dede (1986) who discuss the function of accusative marking in Turkish and argue that it is one of the strategies to mark NPs as definite. Enç (1991), on the other hand, maintains that accusative case marking is employed to indicate specificity in Turkish. Her claim is that specific and definite NPs are closely related to each other in that both require that their referents be linked to previously established discourse. The term *specificity* is a controversial concept partly because there has been a number attempts to define what it really refers to as well as there has been different statuses of specificity in the literature such as *scopal specificity* and *partitive specificity*, among others. Nevertheless, to give a formal definition of specificity, along the lines with Kelepir (2001), one can say that specificity requires that there is some previous discourse or background knowledge to which both speaker and the hearer can relate the denotation of the NP in question. In this respect, we can safely say that the framework developed by Enç is in line with the theory of (in)definiteness proposed by Heim (1982, 1983) who notes that the distinction between definite and indefinite NPs can be accounted for by the Familiarity Hypothesis which states that the referents of the definite descriptions must be already familiar to the hearer. Enç gives the example in (1) from English [eng] to illustrate this.

[1] The notion of D(iscourse)-linking was proposed by Pesetsky (1987) for those *wh*-phrases that are assumed to be D-linked (i.e. *which* book). In contrast to that, *who* or *what* are considered to be non D-linked.

(1) Five children arrived late. *They* missed the bus. (Enç, 1991 p.9)

Enç argues that in (1) the use of the pronoun in the latter sentence is appropriate only if it is co-indexed with the NP in the former sentence. The point here is that those NPs that bear accusative case marking are always specific in Turkish whether they are definite or indefinite. That is to say, they have to be related to some sort of an antecedent in the discourse (either a strong or weak antecedent, in Enç's terms). The lack of accusative marking, on the other hand leads to ungrammaticality. This is illustrated in (2) and (3).

(2) Zeynep Ali-yi / on-u / adam-ı gör-dü
Zeynep-NOM Ali-ACC he-ACC man-ACC see-PAST
'*Zeynep saw Ali/him/the man.*'

(3) Zeynep *Ali / *o / *adam gör-dü. (Enç, 1991 p.9)
Zeynep-NOM Ali / he / man see-PAST
Intended reading: '*Zeynep saw Ali/ him/the man*.'

In (2) the proper name, the pronoun and the accusative marked NP respectively refer to definite descriptions and require overt case marking. Their non-accusative marked counterparts, on the other hand, are out as given in (3). Enç (1991) also claims that partitive constructions are another instance in which accusative marked NPs are always assigned a specific reading since the referent of partitive-specific NPs is considered to be already established in the discourse[2]. What this indicates is that accusative marked NPs are obligatorily interpreted as specific (i.e. D-linked) whereas NPs without accusative marker are non-specific (non-D-linked) in Turkish. Enç gives the following to illustrate that.

(4) Odam-a birkaç çocuk gir-di. (Enç, 1991 p.6)
My room-DAT several child enter-PAST
'*Several children entered my room*.'

(5) a. *İki kız-ı* tanı-yor-du-m.
two girl-ACC knowPROG-PART-AGR
'*I knew two girls*.'

b. *İki kız* tanı-yor-du-m.
two girl know-PROG-PAST-AGR
'*I knew two girls*.'

Given the sentence in (4) in the context as the background, the difference in case marking in (5a-b) indicates a distinction in the interpretation of sentences. The reference of the NP in (5b) should be new while the NP in (5a) introduces entities from previously given discourse. In other words, two girls in (5a) are included in the set of children introduced in (4) whereas this is not the case in (5b). However, this analysis predicts that those NPs without accusative case should never be associated with anything that is mentioned in the immediately previous utterance. In contrast to what one should expect, this prediction is not borne out in those cases in which an NP without case marking introduces an entity from a given set. Given the sentence in (4) again as the background, the NP refers to an already given entity in (6) below.

(6) İçlerinden *iki kız* tanı-yor-dum.
Among them two girl know-PROG-PAST-AGR
'*I knew two of the girls*.'

The NP in (6) can be clearly interpreted as previously established or given in the immediate discourse as the PP *içlerinden* indicates a previously defined set. This means that the presence of accusative case marking is not always necessary to refer to a previously given set since this is provided by the presence of the PP. This is also true for the NPs in sentences (8a) and (8b), given (7) as the context.

[2] Note that there are two types discourse-linking at work here. The relation of definite NPs and discourse–linking is established through the *relation of identity*, whereas this relation in specific indefinite NPs is established by what is referred to as the *subset relation*.

(7) Bugün *araba* almak icin oto galerisine git-ti-k.
today car buy for car dealer go-PAST-AGR
'*Today we went to a car dealer to buy a car.*'

(8) a. Orada *iki araba-yı* satın al-dı-k.
there two car-ACC buy-PAST-AGR
'*We bought two cars there.*'

b. Orada *iki araba* satın al-dı-k.
there two car buy-PAST-AGR
'*We bought two cars there.*'

In (8a) and (8b), both NPs can refer to the broad set of cars established in the previous utterance similar to the one discussed above. In fact, the status of NPs with no case marking has been discussed earlier in the literature by those such as Tın & Akman (1992) and Turan (1995) in which they argue that NPs without accusative case marking are ambiguously interpreted as specific in discourse initial position. Consider the sentences below.

(9) a. Ahmet *siyah bir araba*$_i$ arı-yor-du.
Ahmet black one car seek-PROG-PAST
'*Ahmet was looking for a black car.*'

b. Bir süre sonra *o-nu*$_i$ bul-du.
A while after it-ACC find-PAST
'*After a while he found it.*'

The NP *siyah bir araba* in (9a) does not have accusative case, yet it can still have a specific or non-specific reading discourse initially. The use of a pronoun later in the discourse makes the reading specific. In other words, lack of case marking does not make the NP non-specific. The discussion so far has shown that accusative case marked NPs in Turkish do not always denote specific entities (i.e. D-linked) and those NPs which do not have accusative marking are not obligatorily non-specific. Now I turn to the status of partitive-indefinite expressions which are generally regarded as having specific status.

When we consider the partitive expressions which Enç (1991) argued to be always specific and therefore they must be marked with accusative case, it has also been proposed that this should not be always the case. As has been extensively investigated by von Heusinger and Kornfilt (2005) and Kornfilt (2008), among others, not all partitives can be obligatorily interpreted as specific and partitivity cannot always be associated with specificity. Von Heusinger and Kornfilt convincingly show that some partitive expressions in Turkish can be interpreted as non-specific and therefore lack overt structural (i.e. accusative) case. This is provided in (10) and (11).

(10) Ali kadın-lar-dan *iki kisi* tanı-yor-du. (von Heusinger & Kornfilt, 2005 p.32)
Ali women-PL-ABL two individual knew-PROG-PAST
'*Ali knew two individuals of the women.*'

(11) Meyva-lar-dan *üç tane* ye-di-m.
fruit PL-ABL three item eat-PAST-AGR
'*I ate three (pieces of) fruit.*'

The examples in (10) and (11) clearly illustrate that accusative case marking can be omitted in the partitive constructions, giving rise to non-specific interpretation of the partitive NPs. That is to say, the grammaticality of the sentences above shows that there can be partitive structures whose NP can refer to non-specific entities.

In addition to this, von Heusinger and Kornfilt (2008) also argue that overt structural case in Turkish, which otherwise indicates semantic specificity loses this function when the presence of this marker is required due to other reasons than specificity requirement. In other words, accusative case appears in the structure despite the lack of specific reading. Consider the sentences in (12) and (13) below.

(12) Meyva-lar-dan *üç* *tane-sin-i* ye-di-m. (von Heusinger and Kornfilt, 2008 p.5)
fruit PL-ABL three item-AGR-ACC eat-PAST-AGR
'*I ate three specific (pieces of) fruit*.'

(13) Öğrenci-ler-den *üç* *tane-sin-i* tanı-yor-du-m.
Student-PL-ABL three item-AGR-ACC know-PROG-PAST-AGR
'*I saw three ("units" of) students*.'

What is significant in (12) and (13) is that they are ambiguous between a specific and non-specific reading. This should indicate that accusative case marker is not a good candidate to illustrate semantic specificity. Von Heusinger and Kornfilt (2008) argue that the presence of accusative case marker in those instances (i.e. ablative as well as genitive partitives) is characterized due to the *formal* specificity rather than *semantic* specificity[3].

The above discussion has shown that not all partitive expressions display specificity as there are instances in which they exhibit ambiguity between specific and non-specific interpretation. Furthermore, it was also pointed out that not all partitive expressions require the presence of overt accusative case in the structure in which they appear. This was also taken as evidence that there exist non-specific partitive constructions in Turkish. Therefore, the conclusion to be drawn here is that the use of overt case marking cannot be considered to be strong evidence that it should mark NPs as specific in Turkish. Instead, in the next section, we propose an alternative account in which these facts can be captured under the Givenness Hierarchy framework. In other words, it will be shown that the Givenness Hierarchy can account for the facts whereas the framework proposed by Enç (1991) does not provide a full account to explain certain facts and how the GH is better equipped in dealing with the data.

3 Proposal: The Givenness Hierarchy

The Givenness Hierarchy holds that certain expressions (i.e. determiners, pronouns) constrain possible interpretations of nominals by signaling different cognitive statuses (memory and attention) that the referent is assumed to be in the mind of the speaker (GHZ, 1993, 2001, 2004). In other words, the statuses in the hierarchy correspond to memory and attention states from most restrictive 'in focus' to the least restrictive 'type identifiable'. This is given in (14) below.

(14) The Givenness Hierarchy

in focus	>	activated	>	familiar	>	uniquely identifiable	>	referential	>	type identifiable
it		that this this N		that N		the N		indefinite this N		a N

In this hierarchy, there are six cognitive statuses and each status subsumes the others to the right. That is to say, anything uniquely identifiable is also referential, but not vice versa[4]. By using one form, the speaker acknowledges that the associated cognitive status is provided since each status entails a lower status, indicating that all lower statuses have been met. The definition of each status is given in (15) and an example for each is provided in (16).

[3] Details aside, von Heusinger and Kornfilt (2005, 2008) argue that the presence of the nominal element in (12) and (13), due to its pronominal features, requires the presence of overt structural case. In other words, accusative case marking shows up in those instances although it does not denote semantic specificity. Due to space requirements, I will not go into the details of the analysis. The reader is referred to von Heusinger and Kornfilt (2008) for further discussion.

[4] Note that GHZ (1993) investigate five different languages, namely, English [eng], Japanese [jpn], Spanish [spa], Russian [rus] and Mandarin [chi/zho]. In the current paper, only the English examples were provided for the discussion of the underlying assumptions of the framework. See Gundel, Hedberg and Zacharski (1993) for an extensive analysis of these languages.

(15) Six statuses in the Givenness Hierarchy)

a. Type Identifiable: The addressee is able to access a representation of the type of object described by the expression.
b. Referential: The addressee either retrieve an existing representation of the speaker's intended referent or constructs a new representation by the time the sentence has been processed.
c. Uniquely Identifiable: The addressee can identify the speaker's intended referent on the basis of the nominal alone.
d. Familiar: The addressee can uniquely identify the intended referent on the basis of an existing representation in memory.
e. Activated: The referent is represented in current short-term memory.
f. In Focus: The referent is at the current center of attention.

(16) I could not sleep last night.
a. A *dog* kept me awake.
b. *This dog* kept me awake (indefinite reading of *this)*.
c. *The dog* kept me awake.
d. *That dog* kept me awake.
e. *This dog/this/that* kept me awake.
f. *It* kept me awake.

As pointed out earlier, the statuses begin with the least restrictive which is 'type identifiable' and end in the most restrictive 'in focus'. For instance, in (16a) the hearer is only expected to identify what kind of a dog is. In (16b) the hearer is expected to access an appropriate type representation as well as retrieve existing representation with the NP by the time the sentence is processed. On the other hand, when there is a definite NP in the structure, as exemplified in (16c), the addressee is expected to associate a unique representation by the time the NP is processed either by retrieving an existing representation from memory or by constructing a new unique representation. In (16d) the hearer is assumed to have a representation of the entity denoted by the NP in his memory. In (16e) the addressee is expected to associate a representation from working memory. Finally, in (16f) the hearer is assumed to associate a representation that is at the current center of attention. For the purposes of the current study, the main focus is on the status of *referentiality* and how this unique status can account for the accusative marked NPs in Turkish.

4 NPs in Turkish and the Givenness Hierarchy

In the previous sections it was shown that the use of accusative marked NPs cannot be accounted for by referring to specificity. The data analyzed so far have clearly demonstrated that there are those instances in which the presence of accusative case marker cannot be explained as the marker of specificity in partitive constructions or in those other cases. On the other hand, it has been shown that the choice and use of different nominal expression, namely determiners as well as pronouns, are captured in an appropriate manner for those languages like English and other seemingly unrelated languages. Therefore, based on these facts I argue that the use of indefinite NPs that have been previously referred to as 'specific' in Turkish can be better characterized if we assume that they in fact refer to referential entities. That is to say, in those cases an NP gains a referential status so long as the hearer can constructs a new representation by the time the sentence is processed, as was argued to be the case in GHZ (1993). Note that a similar analysis was entertained in Taylan and Zimmer (1994) where it was argued that the use of accusative case suffix is what they term as 'individuation'. Taylan and Zimmer (1994) do not provide a formal account of what 'individuation' actually means but they suggest that it should be characterized as referring to an entity rather than on its being primarily of interest as a member of such-and-such a class. Therefore, it should be pointed out that the proposal sketched here and Taylan and Zimmer's analysis are compatible with each other in this respect. This is exemplified in (17) and (18) below in which the NPs indicate referential status, as predicted.

(17) Cem *birkaç mektub-u* yolla-dı.
Cem some book-ACC send-ACC
'*Cem sent several letters*.'

(18) Adam-lar-ın *bir tane-sin-i* teşhis et-ti-m.
Man-PL-GEN one item-AGR-ACC identify do-PAST-AGR
'*I identified one of the men*.'

The sentences in (17) and (18) show that the use of accusative marking is appropriate if the addressee constructs a new representation by the time the sentence has been processed or retrieve the referent expressed by the partitive construction, rather than the accusative marked NP being established in the previous discourse and should be considered specific. This again indicates to us that the use of accusative marking in such constructions may be sufficient but not a necessary condition for an NP to be considered as specific.

5 Conclusion

This study investigated the interaction of accusative case marking with what is often referred to as specificity in Turkish. The previous studies such as Enç (1991) have argued that accusative case marking encodes specificity, indicating that the presence of accusative case always marks semantic specificity. It was also claimed that the lack of accusative case marking should indicate non-specificity. On the other hand, the current study has shown that this is not always the case as there are cases in which these assumptions are not borne in certain instances. Therefore, the present has proposed that the nature of accusative marked NP in Turkish can be better characterized if we adopt the Givenness Hierarchy framework.

The proposal entertained here has certain implications for investigating other Altaic languages such as Kirghiz [kir], Kazakh [kaz] and Mongolian [mon] as well as the languages of other families such as Finnish [fin], Kannada [kan] and Urdu [urd], among others, in which case morphology is argued to have certain effects on the interpretation of NPs.

6 Abbreviations

ABIL ability
ABL ablative case
ACC accusative case
AGR subject-verb agreement
AOR aorist marker
DAT dative case
NEG negative
NML nominalizer
NOM nominative case
PAST past tense

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The Effect of Speech Rate on the Rhythm of English Dialects

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1 Introduction

This paper demonstrates that changes in speech rate can have a differing effect on the rhythmic properties of dialects of the same language, namely English. New Zealand English, in particular, provides a great testing ground for this kind of investigation, as the two main ethnic dialects of this variety of English have been shown to display differing rhythmic properties (see Section 1.4). The results of the present study show that faster speech rate will cause one dialect to become more syllable-timed, while the rhythm of the other variety remains unaffected by changes in speech rate.

The present paper is structured as follows. Background information about previous research on linguistic rhythm as well as speech rate is given in Section 2. The main differences between the two New Zealand English ethnic varieties are also outlined in that section. The methodology for the current experiment is described in Section 3, while the results are reported in Section 4. Section 5 concludes the paper.

2 Background

2.1 Research on Rhythm

There have been various proposals for the instrumental measurement of rhythm that avoid language-dependant phonological concepts (e.g. syllables), and instead of calculating syllable- and interstress-durations, use purely phonetic characteristics of the speech signal. Ramus et al (1999) segmented speech into vocalic and consonantal segments and computed three acoustic correlates of rhythm:

- %V, the average proportion of vocalic intervals
- ΔC, the average standard deviations of consonantal intervals and
- ΔV, the average standard deviations of vocalic intervals.

Relying on these measurements, the authors plotted eight rhythmically different languages in a three-dimensional space and argued that their results support the notion of rhythm classes.

In other studies, such as Low (1995), Low et al (2001) and Grabe & Low (2002), the authors computed a Pairwise Variability Index, also based on the duration of vocalic and intervocalic segments. This index arguably provides a better control for speech rate variations than does the simple calculation of average standard deviation. The present study follows Grabe & Low (2002) in its method of measuring rhythm (see Section 3). The normalized vocalic Pairwise Variability Index (PVI)[1] is based on the relative difference in duration of successive vocalic segments and is normalized for local rate variations. A low PVI value shows less variation in vowel duration, and as such indicates a more syllable-timed language. Stress-timed languages, on the other hand, typically demonstrate shorter unstressed vowels alternating with longer vowels, resulting in a higher PVI.

2.2 Research on Speech Rate

Speech rate for American English has been measured in many different studies in the past (e.g. Kent & Forner 1980, Walker 1988, Chen 1999). However, only one study has investigated speech rate in New Zealand. Robb et al (2004) compared the speech rate of 40 New Zealand English speakers to 40 American English speakers. They calculated both speaking rate and articulation rate for each speaker. *Speaking rate* is

[1] The present study uses the abbreviation PVI to mean normalized vocalic Pairwise Variability Index, what Grabe & Low (2002) refer to as nPVI.

normally measured as the number of syllables uttered during a speech sample divided by the time taken to complete that speech sample. *Articulation rate* is measured the same way, except all silent intervals are excluded from the calculation, and so the actual speech execution time it measured (Miller et al 1984). Rob et al (2004) found that New Zealanders were significantly faster in both speaking rate and articulation rate than American speakers (speaking rate: US 250 spm NZ 280 spm and articulation rate: US 316 spm ~ NZ 342 spm). The authors hypothesize that one possible explanation for this difference might be vowel raising currently in progress in New Zealand. Higher vowels tend to be shorter in duration which in turn could result in faster overall speech rate. No other study has investigated speech rate in New Zealand, or compared the speech rate of different varieties within New Zealand.

2.3 Research on Rhythm and Speech Rate

It has been argued that the rhythmic measures introduced in Ramus et al (1999) might be strongly correlated with speech rate (e.g. Dellwo & Wagner 2003, Barry et al 2003). Dellwo (2004) argues that if ΔC was determined by speech rate it would describe speech rate rather than rhythm so he calculates a variation coefficient (varcoΔC) to monitor relative ΔC variation across speech rates. His results indicate that the use of varcoΔC better differentiates between languages belonging to different rhythmic classes. It is also shown that stress-timed languages, such as German and English, tend to vary in rhythm as a function of speech rate, while the rhythm of syllable-timed languages, such as French, seems to be unaffected by changes in speech rate. Using the PVI as a measure of rhythm, the present study will demonstrate that the same phenomenon is true in New Zealand with regards to the effect of speech rate on the two main ethnic dialects.

2.4 New Zealand English Ethnic Dialects

Previous research has shown that the two main ethnolects of New Zealand English display distinct rhythmic qualities (e.g. Holmes & Ainsworth 1996, Warren 1998, Szakay 2006). Using the normalized vocalic Pairwise Variability Index (PVI) to measure rhythm, as suggested by Grabe & Low (2002), Szakay (2006) showed that Maori English is significantly more syllable-timed than Pakeha English, the main variety used by speakers of European descent. The two varieties also differ in other suprasegmental features, such as the use of the High Rising Terminal contour, and mean pitch.[2] Segmental features have also been identified (e.g. Bell 2000). Maori English is said to exhibit u-fronting, th-fronting and stopping, as well as final z-devoicing and possibly initial t-non-aspiration. However, the different features of the two ethnolects are possibly better described as quantitative rather than qualitative.

3 Method

The present study used 36 New Zealand English speakers to measure rhythm and speech rate.[3] The recordings were carried out in quiet room in the participants' own home using a Samba AV Digital Player and Recorder, which produces files in .wav format. Of the 36 speakers, 24 (12 female and 12 male) identified themselves as Maori and 12 (6 female and 6 male) as Pakeha. All ranged between 18 and 65 years of age. Speakers were recorded reading a passage as well as telling a narrative. This resulted in 72 passages available for analysis and enabled comparison of potential differences according to style. The reading passage consisted of 6 sentences taken from the book titled The Little Prince (de Saint-Exupery 1943). Participants had a chance to study the passage before being recorded. To elicit more informal, spontaneous speech style passages, the speakers were recorded telling a narrative. They were asked to talk about rugby or other sports of their choice, as it is believed that most New Zealanders are keen on these topics and could easily and enthusiastically talk about them.

[2] For a detailed analysis of the production and perception of suprasegmentals in New Zealand ethnic dialects, consult Szakay (2008).
[3] These are the same speakers and passages as used in Szakay (2006) and Szakay (2008).

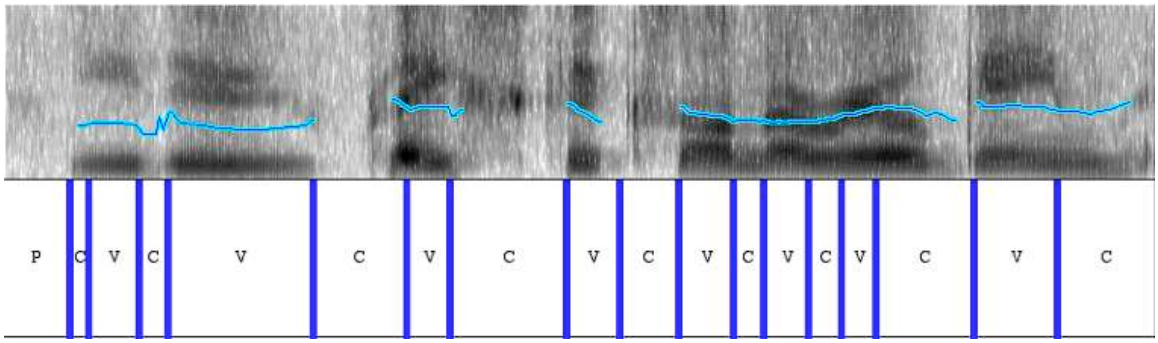

Figure 1 Segmentation of the speech signal into vocalic and consonantal intervals

All acoustic analysis and phonetic segmentation of the recordings was carried out using the Praat acoustic analysis software (Boersma & Weenink 2006). The first 3 sentences of each reading passage were used in the analysis, as well as 10-15 seconds of each narrative (depending on where the intonation phrase ended). Phonetic segmentation was done manually, using textgrids in Praat. Each passage was manually segmented into vowel, consonant and pause sequences, necessary for the analysis of syllabic rhythm. This is shown in Figure 1. Both auditory and acoustic cues were used for the segmentation. Following Grabe and Low (2002), diphthongs as well as adjacent vowels were treated as one vocalic segment, whereas initial glides were marked as consonants.

Altogether, 3281 vocalic segments were analyzed and measured. Phrase final segments were included, while pauses and hesitations were excluded from the analysis. The normalized vocalic PVI values were calculated based on the difference in duration between each pair of vowels in successive syllables, taking the absolute value of the difference and dividing it by the mean duration of the pair. The output is multiplied by 100 as the normalization produces fractional values.

Speech rate was analyzed as vocalic segments per second, and was actually measuring *speaking rate*, not articulation rate.

4 Results

As reported in Szakay (2006, 2008), the PVI values for the Maori speakers were significantly lower than those for the Pakeha speakers. This demonstrates that Maori English is significantly more syllable-timed than Pakeha English. Figure 2 shows the distribution of PVI values across speakers of the two varieties.

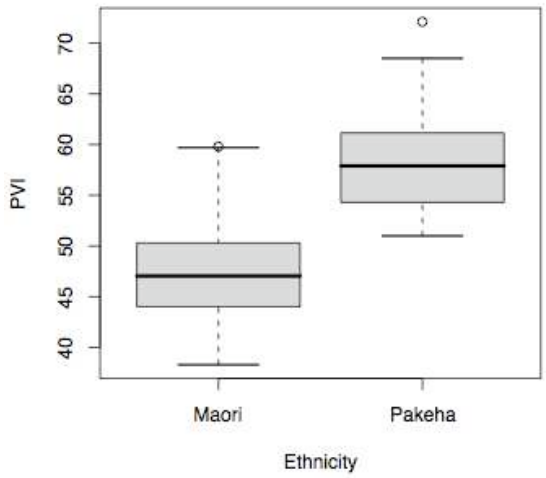

Figure 2 Vocalic PVI values for Maori and Pakeha speakers (where high PVI = more stress-timed, low PVI = more syllable-timed speakers), p<.0001.

The results relating to speech rate showed no statistically significant results between the two dialects. Maori participants showed a slightly lower speech rate, with a mean of 4.44 V/sec, as opposed to the mean of 4.62 V/sec for Pakeha speakers. This trend, however, is far from significant. There were also no significant differences with regards to speaker gender or whether the speech sample was taken from the narratives or the reading passages.

A significant correlation was found between the PVI values of Pakeha speakers and speech rate (Spearman's rho = -.45, p = 0.026). Shown in Figure 3, as the speech rate of Pakeha speakers increases, their PVI values decrease, that is, the faster they speak, the more syllable-timed they become. However, speech rate does not affect the rhythm of Maori English speakers.

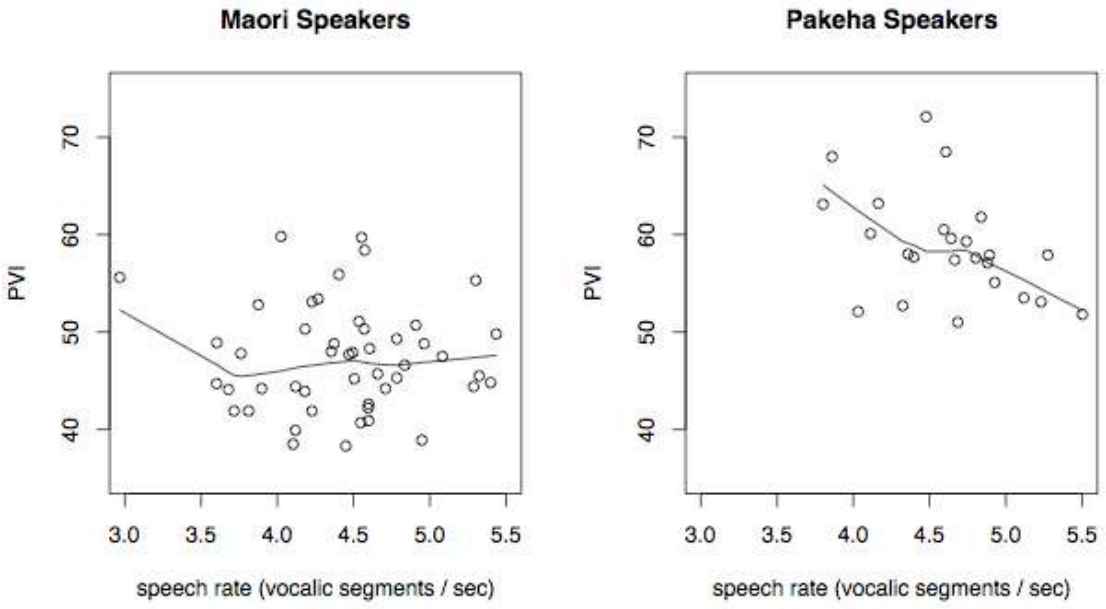

Figure 3 The correlation between rhythm and speech rate. Maori speakers: non-significant. Pakeha speakers: $p<.05$, Spearman's rho=-.45

5 Summary

Although the vocalic PVI is assumed to be normalized for local speech rate variation, the results indicated a correlation between PVI and global speech rate in the case of Pakeha speakers. Faster speech caused Pakeha English to become more syllable-timed, while Maori English rhythm was not affected by speech rate. Rather than being socially motivated like, for example, the use of rhythm and the High Rising Terminals in these two dialects, it seems that the varying effect of speech rate on rhythm is conditioned by internal linguistic factors. Dellwo (2004) demonstrated the same effect for different languages belonging to different rhythmic groups. Stress-timed languages (e.g. German, English) tend to vary in rhythm as a function of speech rate, while the rhythm of syllable-timed languages (e.g. French) seems to be unaffected by changes in speech rate. The fact that we find the same difference between Pakeha English and Maori English indicates that Maori English clearly patterns with syllable-timed languages even in this respect, not only by exhibiting lower PVI values. Moreover, the results of this study extend on previous research by showing that such a difference with regard to rhythm and speech rate can exist not only between different languages but also between different varieties of the same language and *within* different dialects of the same national variety.

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Is Lexical Access Mediated by the Syllabic and/or CV Structure of Words? Exploring Transposed-Letter Priming Effects

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1 Observations

Aciocnrdg to a rcaerheesr at Cmargbdie Uiistenvry, it deos not meattr in waht oerdr the leterts in a wrod are; the olny inmaptort tinhg is taht the frsit and lsat lteter be in the rghit pclae. This observation, circulated in a popular email circa 2003, underlines the freedom that is afforded to letter position in visual word recognition. Although it can be argued that other components of the language processor aid in this type of example, i.e. syntax and semantics, there is clearly a range of freedom for the orthographic system that is curiously large when considering the fact that the lexical processor must also be precise enough to distinguish between the positions of 's' and 'u' in the words *casual* and *causal*. How the lexical access system is organized such that it can be flexible enough to make the correct lexical retrieval for *FIRST* when given *frsit* and precise enough, when given *casual*, to recall *CASUAL* to the exclusion of *causal* is currently a growing topic of debate.

The lexical phenomenon pointed out in the Cambridge email is known in the literature as *Letter Transposition Similarity Effects*. One of the most robust characteristics of the phenomenon, and highlighted in this email, is the observation that a non-word prime in which the inner-letters have been transposed, such as *rghit* is much more similar to the target *RIGHT* than a non-word in which the first and last letter have been transposed, such as *tighr* (Perea and Lupker, 2003; Peressotti and Grainger, 1999).

However current research probing these effects suggest that letter-position is even more unconstrained. Schoonabaert and Grainger (2004) show that letter-deletion also primes consistently, in pairs such as *mircle-MIRACLE*, despite the fact that the deletion of the vowel 'a' changes word-length and removes lexical input. In addition, Perea and Lupker (2004) point to evidence suggesting that non-adjacent transpositions show strong priming effects as well, *caniso-CASINO*.

This evidence may in fact give the impression that letter-transposition effects show that lexical processing is not positionally constrained at all. However, research also shows that there are limits to the ability of the lexical system to freely encode letter position. As pointed out earlier, the word periphery positions appear to be 'special' in visual word recognition. Hence the non-word *nositiop* does not prime *POSITION*, (Jordan et al., 2003). Perea and Lupker (2003) provide evidence showing that transpositions are sensitive to word-final transpositions, **judeg-JUDGE*.[1] In other findings, Inhoff et al. (2003) provides evidence that in fact not only the first letter but first *letters* are particularly crucial in lexical access, **omuse-MOUSE*.

Although evidence suggests that letter position may be highly flexible, even deleted from a stimulus input and still show priming, the same flexibility is not extended to letter replacement (Perea and Lupker, 2003). Replacement of the letters 'a' and 'o' with 's' and 'r', **bslcrn- BALCON*, not only does not induce but inhibits priming. In addition, letter transposition appears to be limited to some abstract sense of linear order as findings from experiments conducted by Peressotti and Grainger (1999) show. Despite the orthographic overlap no priming is found in pairs like **nlcb-BALCON* where there is priming in pairs like *blcn-BALCON*.

2 Theoretical Background

These findings from Transposed-Letter Effects pose difficult questions for position-specific coding schemes employed in many computational models of visual word recognition. Models such as the *Interactive Activation Model* (IA) (McClelland and Rumelhart, 1981), the *Dual-Route Cascaded Model* (DRC) (Coltheart et al., 2001) and the *Multiple Read-Out Model* (MROM) (Grainger and Jacobs, 1996) use slot-

[1] An asterisk is used to indicate pairs in which no priming occurs.

coding to read specific activation levels for letter position and identity. These models can adequately deal with the findings that letter periphery position and letter replacement is more rigidly tied to successful access of a lexical item. However, in light of empirical evidence that indicates that lexical access is also flexible enough to allow letter-deletion and adjacent and non-adjacent inner-letter transposition that respects some notion of relative position we are left without a satisfactory account of the lexical access system.

More recent models such as the *Self-organizing Lexical Acquisition and Recognition* (SOLAR) (Davis, 1999) and *Sequential Encoding Regulated by Inputs to Oscillations within Letter units* (SERIOL) (Whitney, 2001) use spatial encoding techniques in order to avoid the pitfalls of slot-encoding schemes. These models are particularly adequate for dealing with the data unaccounted for in slot-coding models, namely letter-transposition and deletion case mentioned here, as letter identity is not calculated in direct correspondence with position, rather relative position and weighted activation allow for increased letter-position flexibility. Under this type of system, word transposition is constrained computationally by emphasizing the descending importance of letter position from left to right including a special slot for word final position.

Spatial models, then, seemingly provide the necessary equipment to both account for the flexibility and precision noted to be active in visual word recognition. However, these models impose no mediating constraint on transpositions that occur among interior letters, from now on inner-letter transposition. Guerrera (2004) demonstrates in a battery of experiments systematically testing the flexibility of transposed-letter effects that both the SOLAR and SERIOL models in fact over-generate in target/prime pairs such as **isedawkl, SIDEWALK* in which all letters have been transposed. Spatial coding models predict priming in these cases where none is found suggesting that there is some form of constraint on the flexibility of letter position coding. Guerrera suggests a model in which there are in fact two stages in the search; one which checks for a critical subset of the letters, and another the checks specific letter position from left to right. In this system at least two letters in the prime must ultimately match in identity *and* position for priming effects to be observed.[2]

This finding raises the question as to the basis of transposed-letter constraints. In order to address this question the current study probes the existence of syllabic and/ or CV structural sublexical components involved in lexical access in English as the possible source of transposed-letter effects. Specifically, is lexical access sensitive to structural notions of syllable or underlying CV pattern?

2.1 Previous Investigation on Syllable and CV Structure

As early as 1976 there has been speculation that syllabic structure has an influence on lexical access. Taft and Forster (1976) suggest that the first syllable serves as a means to access a lexical entry. In later work (Taft, 1979) formulated a metric for orthographic syllables coined the BOSS (Basic Orthographic Syllable Structure) pointing to a unique orthographic syllable component used in mediating lexical access. However, the most robust evidence for the syllable as strategy in word recognition comes from work on languages other than English. Carreiras and Perea (2002) found that for Spanish priming is stronger for sequences in which syllable overlap is maintained *pa####, PA.SI.VO* , in contrast to priming pairs in which more letters are overlapped **pas###, PA.SI.VO*.

The argument has been made that robust effects pointing to the syllable's influence on lexical access are tied to the regularity of syllabic structure in the language in question (Taft and Radeau, 1995). This has been the main contention against English and the existence of an active sublexical syllabic component. The observation that the English syllable is more difficult to define compared to the syllable, for example, in Spanish complicates strategic use of this metric.

Another curious finding, also from Spanish, is that less priming in consonant transposition than vowel transpositions. Perea and Lupker (2004) produced less priming for non-adjacent consonants transpositions, such as the pairs **casino, CASINO*, than in pairs where non-adjacent vowels were transposed, *anamil, ANIMAL.*

This data appear to support a further layer of sublexical abstraction, namely a CV pattern distinction.[3] Furthermore, unpublished evidence from Dutch suggests primes that respect the sequence of vowels and consonants of the target, such as the pairs *bruek, BREUK* are more efficient that primes that do not, such

[2]This is based on target/prime pairs of eight-letter words. The number of necessary position specific matches may vary according to target/prime word length.

[3]Independent literature also attests a consonant/ vowels processing distinction (Caramazza et al., 2000; Lee et al., 2002).

as **beruk, BREUK* (Martensen, 2006) suggesting that the underlying CV pattern of words is calculated and employed to select target sets of lexical candidates in lexical access.

Therefore the investigation here, to probe the freedom of transposed-letter effects using structural notions of syllable and CV structure as a working hypothesis, faces immediate challenges given considerations for English mentioned. For this reason the stimuli here were specifically chosen to enhance syllabic regularity by selecting a) the most common and most clearly defined syllabification pattern, which is CVC.CVC and b) the most constant CV structure, simultaneously. These characteristics are found in words such as *NOR.MAL.* This class constitute 25% of six letter combinations, the most dominant pattern for all words with letter length (4-9) based on the CELEX database for English (Baayen et al., 1993). The belief here is that if syllabic and/ or CV patterns do play a role in English that the more regular patterns in the language should show the most robust, and therefore most detectable effects.

3 Experiment 1

The purpose of experiment 1 is to test the hypothesis that the syllable is an active component in lexical access and that syllabic boundaries are employed as structural cues for the search process. If lexical access does have a structural component that corresponds to syllabic properties the letter-transposition effects should be sensitive to transpositions of letters that disrupt these structures, ultimately yielding priming asymmetries between primes where letter-transposition takes place across a syllable boundary and another in which letter-transposition occurs entirely within the syllable.

3.1 Methods

Participants Nineteen undergraduate students and one graduate student participated in the experiment. Undergraduates were enrolled in an introductory psychology course at the University of Arizona and received course credit for their participation. *Stimuli Selection and Design* Sixty four target words six letters in length and of mid to low frequency were selected from the CELEX database for English (Baayen et al., 1993). All were monomorphemic in order to eliminate any other sublexical interference such as morphological structure in the stimuli (Andrews et al., 2004) and were composed of an underlying CVCCVC ((C)consonant (V)vowel) pattern for CV consistency across all words and to enhance the regularity of syllabification.

Half of the words were syllabified CV-CCVC such as the word ‘re-gret’ and the other half syllabified CVC-CVC as in the word ‘nor-mal’.[4] The third and fourth letters were transposed in each set of words to create the non-word primes to avoid left-to-right superiority effects: *rerget, REGRET* and *nomral, NORMAL.* A control set created, controlled for length and frequency in parallel with the target words. All stimuli were counterbalanced into two lists and randomized for presentation according to the following procedure.

Procedure The experiment was controlled by a Pentium PC, using the Windows DMDX software developed by J.C. Forster at the University of Arizona (Forster and Forster, 2003). Items were presented as black, lower-case letters in New Courier font on a white background using a color monitor with a refresh cycle of 10 ms. The forward mask (e.g., ######) and the upper-case target were presented for 500 ms, and the prime was presented for 40 ms in order to avoid any awareness of the prime.[5] Participants were asked to decide whether the presented word was a English word, and respond by pressing a button, ‘Yes’ or ‘No’. They were also instructed to respond as quickly as possible without making errors and that this task was not a vocabulary test. Feedback was given and a practice set of 6 words and 6 non-words was given before testing.

[4]Feedback from a reviewer points out that the ‘reget’ condition and the ‘normal’ condition also confound stress. I will assume here that this phonological process is not a factor in orthographic word recognition. This may appear to be somewhat misleading as the topic under investigation in experiment 1, the syllable, is clearly based upon a phonological entity. Nevertheless, the syllable here is employed as orthographically analogous to the phonological syllable. On this point, it has been proposed that there is in fact an orthographic syllable (BOSS) (Taft, 1992) that is not directly congruent to its phonological counterpart. However, I’ve chosen to approach the current investigation using the phonological syllable as directly correspondent to the ‘orthographic’ syllable as there is no principled reason for preferring the BOSS calculation.

[5]In a pilot study, some participants reported being at least partially aware of the prime. Given that priming effects do not exceed 40 ms, this appears to be the maximum gain attainable and therefore, any prime given longer than 40ms is no more effective in producing priming.

3.2 Results

Data Modification The mean Reaction Times (RTs) were collected for correct responses and trimmed to remove outliers. All RT below 300ms and above 1500ms were removed. *Overall Test* Overall mean latencies can be seen in Table 1 and 2.

Table 1: Across Syllable Mean RTs

TARGET	Across Syllable		Priming
NORMAL	nomral	sketch	
(ms)	560.38	589.14	29.13

Table 2: Within Syllable Mean RTs

TARGET	Within Syllable		Priming
REGRET	rerget	health	
(ms)	574.16	600.10	25.94

The data was analyzed using a 2x2x2 mixed design ANOVA with POSITION(Across Syllable, Within Syllable) and PRIME TYPE(Related, Unrelated) as within-subjects factors and GROUP(A,B) as the between subjects factor. In the items test POSITION(Across Syllable, Within Syllable) and GROUP(A,B) were between subjects and PRIME TYPE(Related, Unrelated) as a within-items factor. The main effects for POSITION were significant by-subjects ($F1(1,20)= 11.53$, $p<.01$) but not by-items($F2(1,60)= 1.49$, $p<1$) with no significant errors in the by-subjects nor by-items tests. However, the main effects for PRIME TYPE were significant by-subjects and by-items ($F1(1,20)= 18.08$, $p<.001$); ($F2(1,60)= 18.84$, $p<.001$) and no significant errors. The interaction between POSITIONxPRIME TYPE was not significant.

3.3 Discussion

The results here point to significant priming in both Across Syllable and Within Syllable conditions reaffirming the ability of the lexical access system correlate transposed-letter primes with their corresponding target words. However, the priming is not significantly larger for the Across condition than the Within condition. The hypothesis that syllable structure mediates the lexical processor cannot be confirmed from the evidence presented here. In absence of a syllable effect, the evidence points instead to orthographic overlap as the key dynamic. However, it may be the case that there is a syllable effect but given that the items in this experiment were specifically chosen to represent the most dominant and clearly defined syllable pattern in English it is quite likely a negate-able effect.

The question remains, however, whether the consonant/vowel distinction is the relevant strategy for English instead of the syllable. Experiment 2 aims to investigate this question.

4 Experiment 2

Experiment 2 aims to investigate the hypothesis that the underlying CV pattern cues lexical access. If primes that share the same underlying CV pattern as their targets prime better than primes in which CV pattern is dissimilar to their targets, all else being equal, then the CV distinction would appear to be an active component in early word recognition.

4.1 Methods

Participants Forty undergraduate students participated in the experiment. Undergraduates were enrolled in an introductory psychology course at the University of Arizona and received course credit for their participation. *Stimuli Selection and Design* Eighty target words 6 letters in length and of mid to low frequency were selected from the CELEX database for English (Baayen et al., 1993). All were monomorphemic and, again as in Experiment 1, were composed of an underlying CVCCVC ((C)consonant (V)vowel) pattern. From the eighty target words the following four lists were created. 1) Left Transpositions: the 2nd and 3rd letter positions were transposed as in *wnader, WANDER* thus, creating an underlying CCVCVC pattern. 2) Center Transpositions: the 3rd and 4th positions were transposed as in *wadner, WANDER* resulting in an underlying CVCCVC pattern. 3) Right Transpositions: the 4th and 5th letter positions were transposed as in *wanedr, WANDER*, underlyingly CVCVCC. 4) Control: a control group of unrelated words was created that was matched for letter length and word frequency.

Procedure Same as in Experiment 1.

4.2 Results

Data Modification The mean Reaction Times (RTs) were collected for correct responses and trimmed to remove outliers. All RT below 300ms and above 1500ms were removed. *Overall Test* Overall mean latencies can be seen in Table 3 and 4 (by subject and by item).

Table 3: Condition Mean RTs by-subjects

TARGET	Left	Center	Right
WANDER	wnader	wadner	wanedr
(ms)	539.83	542.68	536.30
priming	22.6	19.75	26.13

Table 4: Condition Mean RTs by-items

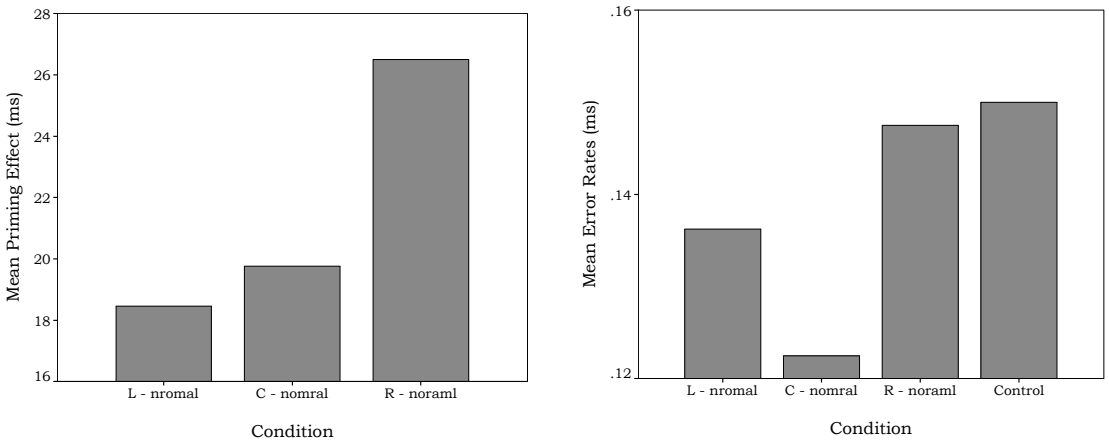
TARGET	Left	Center	Right
WANDER	wnader	wadner	wanedr
(ms)	553.48	552.18	545.44
priming	18.46	19.76	26.5

The data was analyzed using a 4x4 ANOVA mixed design with the factor GROUP(A,B,C,D) as a between-subjects and between-items factor and PRIME TYPE(Left, Center, Right, Control) within-subjects and within-items factors. The overall test showed main effects for PRIME TYPE by-subjects ($F1(3,108)= 7.89$, $p<.001$) but not by-items ($F2(3,228)= 2.48$, $p<.1$) with no significant error in either test. Follow-up pairwise comparisons revealed that the Center condition differed significantly from the Control condition ($F1(1,36)= 10.54$, $p<.05$); ($F2(1,76)= 6.95$, $p<.05$) as did the error rates ($F1(1,36)= 6.59$, $p<.05$); ($F2(1,76)= 4.40$, $p<.05$). Again, the Right condition differed significantly from the Control condition (Right($F1(1,36)= 22.02$, $p<.001$); ($F2(1,76)= 6.36$,$<.05$)). The Left condition significantly differed from the Control condition in the by subjects test Left($F1(1,36)= 15.39$, $p<.001$) but not by items $F2(1,76)= 2.20$, $p>.1$. Another striking result is that neither Left nor Right conditions had significant errors.

Therefore, there was significant priming for Center and Right conditions with the Center condition having significantly lower error rates than both of the other conditions in comparison with the Control condition. No significant priming effect was found for Left condition transpositions.

4.3 Discussion

These data appear to point away from CV structure as a calculated metric in the lexical access processor. Center transpositions, the only primes that maintain the underlying CV structure prime less than Right transpositions which do not maintain CV structure. The results here initially point to a dominant left to right superiority effect as the Left condition was the only condition that failed to produce consistent priming and the Right condition showed the strongest priming overall, graphically in Figure 1(a). In line with previous results (Guerrera, 2004; Davis, 1999) primes with more letter position matches in the left of the word obtain more robust priming effects.



(a) Left to Right Priming

(b) Overall Response Errors

Figure 1: Priming Effects

Thus, if there is a CV pattern effect this effect is likely eclipsed by the priming advantage of more position specific matches from left to right.

An interesting, but more difficult, result to incorporate is the significant drop in error rates for primes that shared a common CV structure with the target word seen in Figure 1(b). This result, in effect, says that participants were less accurate in responding correctly to the target word as a word or not of English when the prime given did not share the same underlying CV pattern as the target.[6]

How to interpret these two effects is a difficult question. On first examination, the significant drop in errors for primes that contained CV sequences that matched their corresponding target forms appears to be evidence supporting the hypothesis that CV patterns at least recognized in some capacity in lexical access in English. However, the relevant question here is, what does accuracy in lexical decision tasks mean?; a question outside the scope of the current analysis.

5 Discussion & Conclusion

Letter-Transposition Effects indicate that the lexical access system permits flexibility in letter position. As discussed, there is some consensus that word-initial and word-final positions have a privileged status in this system. Yet there is little agreement on the positional import of inner-letters. The working hypothesis of the current investigation is that there is a sublexical component to lexical access that is structural in nature. In other words, accessing the lexicon is mediated by a layer (or layers) in which structural properties of words are recognized and employed as tools to gain access to a lexical item.

Given evidence from other research, here the investigation centered on two potentially active sublexical components: the syllabic and CV patterns of words. Although robust priming was found in Experiment 1, no

[6]In the case of the control items, which elicited the most errors, the mismatch was not only on the CV level but also at the letter identity level as the controls did not orthographically overlap in any consistent way.

significant differences between prime/target pairs where transpositions appear across the syllable boundary versus within the syllable were found. This, despite efforts to select stimuli that best represented regular syllabic patterns to counteract ambiguities particular to English. Experiment 2 also resulted in less-than-convincing evidence that the CV patterns of English words are employed in lexical access. However, their may be an effect for CV patterns in English but only if this effect is less than left-to-right superiority effects.

The question now is how to interpret the null findings for syllabic and CV patterns here given their attested existence in other research. The most likely approach is that statistical regularity in language patterns can be adopted as strategies for lexical access. In effect, language specific properties are employed by the lexical access system to serve as cues for lexical access. Results showing syllabic effects come from languages that are Syllable-Timed languages, in which syllable length and duration are more constant internally, and across speakers. English on the other hand is a Rhythmically-Timed language and as such allows syllable boundaries to be manipulated in speech, and may vary even among speakers.

As for the CV distinction, languages such as Spanish and Dutch, discussed here, show a processing distinction between consonants and vowels at some level. Evidence from Martensen (2006) suggest that in Dutch this distinction is productive in lexical access to the point that primes that share the underlying CV pattern with targets show priming effects to the exclusion of those that do not. Notably these languages, that do show CV processing asymmetries, also share a closer association between phonological and orthographic forms. English, on the other hand, is not an especially phonemic language.

Table 5: Language Properties and Sublexical Effects:
***ST**: Syllable-Timed language, **PO**: Phonemic orthography*

Lang	ST	PO	Syll Effect	CV Effect
Spanish	x	x	x	x
Dutch	-	x	-	x
English	-	-	-	-

Seen in Table 5, the distribution of syllabic and CV pattern effects appear to come from the very languages that demonstrate regular syllabic patterns and/ or especially close associations between phonological and orthographic forms. English may in fact be sufficiently irregular on these dynamics making syllabic and CV structure a less-than-optimal metric on which to base a viable lexical access strategy. Even more convincing is the finding also from Martensen (2006) that syllabic structure is not active in Dutch; a predicted result if the timing of a language is intimately linked to the use of syllables in lexical access.

This evidence points to language specific sublexical components in lexical access and not a universal strategy across languages. The spatial coding models do not need extensive modification to integrate this hypothesis. The SOLAR model, for example, explicitly incorporates a segmentation-through-recognition component that could be used to explain cross-linguistic differences in syllable and CV structure recognition.

Reaffirmed here is the inability of slot-coding schemes to adequately deal with input in which prime/target mismatch in letter-position providing more evidence in favor of spatial coding approaches. Also reaffirmed are Left to Right Superiority effects, revealing that letter-position is more crucial from left to right. Still unexplained by these results, however, is existence of a strategy or type of strategy adopted by English to constrain inner-letter transpositions. Given the findings here, there is mounting evidence that syllabic and CV patterns are not viable strategies for English.

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To p or to ¬p
Approaching the Semantics and Pragmatics of the Bavarian Particle *fei*[*]

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In this paper I provide a description of the semantic and pragmatic conditions for the so far undescribed Bavarian particle *fei*. I offer an analysis of *'fei'* as a discourse particle with strong verum focus semantics, suggesting that it should be called a verum focus discourse particle. The Bavarian particle encodes both verum focus by contrasting a proposition p with an alternative ¬p, and also acts like a discourse particle since it works on presuppositions in discourse, and does not affect the truth-value of a sentence.

Like Standard German (SG) [deu], the Bavarian dialect (BG) [bar] abounds with discourse particles, which are often called 'shading or toning particles' (*'Abtönungspartikeln')* (Weydt 1969) or more commonly 'modal particles' (*'Modalpartikeln')*. I will follow Diewald (2006) and call these particles 'discourse particles', a term which reflects their frequent use in dialogue a well as their discourse maintenance function (see Diewald 2006 for details). These particles, such as SG *'auch, ja, doch, nur'* and BG *eh, aa, fei, jo',* are notoriously elusive in meaning, difficult to describe, and often lack a one-to-one correspondence in English translation. They are claimed to link an utterance to the larger discourse, i.e. previous utterances, or even 'comment' on the unspoken. This could be a comment on the speaker's attitude, on the listener's beliefs or on the common ground shared between interlocutors (cf. Abraham 1991, Zimmermann 2007). A detailed analysis of *fei* verum focus discourse particle is laid out in the remainder of this paper.

1 *fei*: The Problem

In this section I introduce the problem of capturing the meaning of *fei*. The ineffable nature of discourse particles in general, and the problem of capturing the particular meaning added by *fei* in particular is illustrated below. As an answer to the question 'What does *fei* mean?', speakers can answer with (1a) or (1b).

(1) a. Des is schwer zum sog'n
that is difficult INF.DET[1] say
'That's hard to say'

b. Des is **fei** schwer zum sog'n
that is ***fei*** difficult INF.DET say
'That's hard to say'

The particle cannot be easily be translated into English in (1b), which is not surprising, since English lacks equivalent discourse particles of the kind under discussion here. When asked what the meaning difference between the two sentences is, native speakers relate *'des hoasst eigentlich des Gleiche',* i.e. 'it means about the same'. Yet there is a slight difference; anecdotally, sentences with *fei* are judged to be more emphatic than sentences without *fei*, and speakers report that the particle is used when one wants to emphasize the thing said. The data in (2) show a similar contrast as in (1); (2a) can be uttered to someone who returns from the restroom, and it does not contain the particle. (2b) does, yet again the meaning is altered in a way that at first glance is hard to describe for native speakers of BG (or anyone else).

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[1] I keep my glosses as simple as possible. The abbreviations used are INF=infinitive, DET=determiner, PRON=pronoun, COMP=complementizer.

(2) a. Dei Hos'ntiarl is auf
your pant.door is open
'Your fly is down'

b. Dei Hos'ntiarl is **fei** auf
your pant.door is **fei** open
'Your fly is down'

Given that the sentence pairs in (1-2) can be felicitously uttered with and without *fei*, the question arises what the exact semantic and/or pragmatic contribution of the particle is. In the next section I will introduce my proposal for the contribution that the BG particle *fei* makes to a sentence. Evidence for this proposal is presented in section 3, and in section 4 I will discuss some predictions made by the proposal. Section 5 concludes with a brief summary of my argumentation, and an outlook toward a potential syntactic analysis for the BG particle.

2 Proposal: *fei* as a Verum Focus Discourse Particle

In the remainder of this paper I will argue that BG *fei* is part VERUM FOCUS, part DISCOURSE PARTICLE; it evokes a meaning along the lines of verum focus (Höhle 1992) and acts like a discourse particle by anchoring a host sentence *p* to a pragmatic context of utterance (Zimmermann 2007a, Fischer 2006), and by accessing the interlocutors' epistemic attitudes toward *p*. Like other discourse particles, and unlike some focus particles, the addition of *fei* does not affect the truth-functional meaning of a sentence (Abraham 1991), but influences the felicity conditions in which a *fei*-modified proposition can be uttered. In a nutshell *fei* expresses (3).

(3) [I believe that you believe]$_{\text{DISCOURSE PARTICLE}}$ that [it is not the case]$_{\text{VERUM FOCUS}}$ that [p]$_{\text{HOST UTTERANCE}}$
fei

Or, in the case of a negated host utterance ¬p, *fei* expresses (3'), which is essentially the same as (3)

(3') [I believe that you believe]$_{\text{DISCOURSE PARTICLE}}$ that [it is the case]$_{\text{VERUM FOCUS}}$ that ¬[p]$_{\text{HOST UTTERANCE}}$
fei

This paraphrase of *fei* is the core of my proposal. I suggest that *fei* foregrounds the opposite meaning of the proposition it co-occurs with. It also immediately explains the emphasis that is connected with the use of the particle; speakers use it when they want to assert the polar opposite meaning of what the interlocutor seems to suggest. I propose that *fei* is an overt marker of the speaker's intent to update the common ground. The speaker reacts with *fei* to a proposition *p* assumed by the interlocutor (either explicitly within previous discourse, or implicitly by the interlocutor's non-verbal actions), and corrects the common ground with a *fei* focused assertion: *"I am asserting p, since judging from your behaviour/question/comment you seem to think ¬p, OR just in case that you think ¬p"*.

3 Evidence

In this section I provide evidence for the proposal made in the previous section. I develop my argument by first showing verum focus effects with *fei*. A host proposition *p* is contrasted with the alternative ¬*p* when the particle is added. I argue that this also accounts for the emphasis speakers report for sentences containing *fei*. I then continue in 3.2, by showing that *fei* is less like a focus particle, but more like a discourse particle.

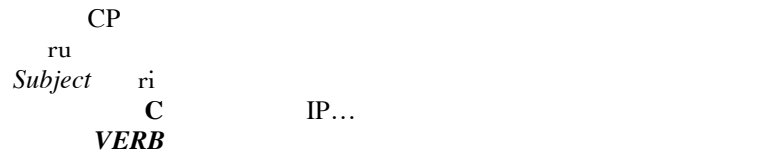
3.1 Fei encodes Verum Focus

I will argue in this section that *fei* encodes verum focus. Verum focus is a type of focus that contrasts the truth polarity of a sentence (Höhle 1992). It contrasts a proposition *p* with its truth counterpart ¬*p* and a

proposition ¬*p* with the opposing *p*. The next paragraph explains in detail the concept of verum focus and shows my assumptions about focus in general. Following, I show how fei fits into the equation.

3.1.1 What is verum focus?

Höhle (1992) proposes that VERUM is an abstract element in CP that expresses a meaning along the lines of '*It is true that* ***p****'*, or *it is the case that* **p**', hence the name (from Latin 'true'). Given that verum is hosted in C, also the syntactic position of the finite verb in German matrix clauses, an activation (by stressing the verb) of the verum element leads to the verum semantics. (4) helps to illustrate.

(4)


(cf. den Besten 1983)

Now consider the data in (5). Caps indicate stress.

(5) A: Hanna behauptet Karl schreibt einen ROMAN.
Hanna states Karl writes DET novel
'Hanna says that Karl is writing a NOVEL.

B: Na, das stimmt. Karl SCHREIBT einen Roman!
Well that be.true Karl writes DET novel
'*Well, that's true. Karl* ***IS*** *writing a novel!'*

The dialogue above is between two people who discuss Karl's writing a novel. B answers with a verum focused matrix verb, realized by the pitch accent. Höhle (1992) demonstrates the effect in German, where verum is overtly realized as stress on whatever element occupies the head of the CP (i.e. C). In matrix clauses in SG and BG this position is occupied by the finite verb, while in subordinate clauses C is occupied by complementizers. Example (5) shows that, somewhat unexpectedly, B can reply to A's statement by focusing the finite verb. B's response is unexpected insofar as that a notion of focus, as proposed in Rooth (1992, 1996), would predict that the lexical content of the verb *schreiben* 'write' is contrasted with other elements of the same type, i.e. with other verbs. Focus in general (just as verum focus) is marked phonologically, via pitch accent that marks a focused constituent (cf. Jacobs 1992, Selkirk 1995).

For Rooth, every expression [[X]] has a ordinary semantic value $[[X]]^{0}$ and a focus semantic value $[[X]]^{F}$. The focus semantic value $[[X]]^{F}$ evokes a set of alternatives for the focused constituent (marked by pitch accent, indicated here by caps). Sentence (6) illustrates.

(6) $[[\text{Karl CAME}]]^{0}$= [[Karl came]]
$[[\text{Karl CAME}]]^{F}$= {Karl went, Karl wrote, Karl danced, Karl slept,…}

This example shows that the focus semantic value of the sentence 'Karl CAME' evokes the set of all possible actions Karl did, i.e. 'Karl X-ED'. Possible alternative focus semantic values for $[[\text{came}]]^{F}$ is the set of activities Karl engages in: {went, wrote, danced, slept,…}. Thus, intuitively, a notion of focus is contrastive, in that it evokes alternatives.

Returning to example (5), for the specific example, the pitch accent on the V2 verb in this case does not encode focus in the sense that it evokes alternatives to the lexical content of the stressed verb, as shown in (7).

(7) a. # B' : '*Karl* ***x*** *einen Roman'*
b. # focus alternatives: {Karl *liest* 'is reading' einen Roman, Karl *kauft*' is buying' einen Roman, Karl *kritisiert* 'is criticising' einen Roman, …}.

In the example given in (5), repeated here as (7a), alternatives as in (7b) are grammatical, yet not felicitous in the given context. The only felicitous possibility is verum focus, an alternative type focus whose contrast set contains only the proposition and its polar opposite, as shown in (8). In terms of focus semantics, in addition to the focus semantic value of a sentence (i.e. $[[X]]^{F}$), a sentence can also have a verum focus semantic value, notated as $[[X]]^{VF}$.

(8) $[[\text{Karl schreibt einen Roman}]]^{VF}$ = {Karl schreibt einen Roman, ¬Karl schreibt einen Roman}

Note that the contrast set introduced by verum focus is in fact the same contrast set introduced by a yes/no question. According to Hamblin (1973), questions are analyzed semantically as introducing the set of possible answers. In the case of a y/n question this is a set of two propositions, based on the question (see also Romero & Han 2001). Consider the y/n question in (8').

(8') $[[$ Schreibt Karl einen Roman$]]^{Q}$ = {Karl schreibt einen Roman, ¬Karl schreibt einen Roman}
writes Karl DET novel?
'*Is Karl writing a novel?'*

Returning to the verum focus example in (8), it follows that if it is asserted that '*It is true/the case that* Karl is writing a novel'[2] , that proposition is contrasted with *'It is **NOT** true/the case that* Karl is writing a novel'. Following below I show that *fei* has verum focus effects as described in this section.

3.1.2 fei encodes Verum Focus

I demonstrate that *fei* displays focus effects, yet is crucially different from other focus particles[3]. One difference is that it can never be stressed itself, yet it still seems to associate with focus. I show in the following that the focus projection of *fei* is necessarily the whole sentence.

The Nuclear Stress Rule (NSR) for German (eg. Höhle 1982, Jacobs 1991), which I adopt for Bavarian, has default sentential stress fall on the object, i.e. *SEPP* in example (9).

(9) Da Hans hod an SEPP ei'glon
DET Hans has DET Sepp invited
'Hans (has) invited Sepp'

Stress assigned with the NSR allows for the widest possible focus projection, i.e. up to the CP. In an alternative semantics framework, (9) could be theoretically contrasted by a seemingly unlimited set of alternatives of the format *x has y-ed z*. Of course that set is in reality limited by discourse-pragmatic restrictions, but the focus projection itself allows for the full range of possibilities. The addition of *fei* to the example (9) doesn't shift the nuclear stress (indicated by caps), as observable in (10).

(10) B: Da Hans hod **fei** an SEPP ei'glon
DET Hans has fei DET Sepp invited
'Hans (has) invited Sepp'

Nevertheless, there is a semantic effect with the addition of the particle, i.e. example (9) does not exactly equal (10). The semantic effect of *fei* relates to verum focus, in that the focus alternative evoked by *fei* is the opposite polarity of the host sentence (10). Consider (10') which gives a possible context to the utterance (10):

[2] Remember that verum, according to Hoehle (1992) is equivalent with "it is true that X"

[3] All of the German focus particles can be stressed in some position (albeit with different foci associated) (Krifka 1998). *Fei* in contrast can never be stressed.

(10') Vroni, Sepp's ex-wife and Christa are talking about an upcoming party. Vroni doesn't know that Sepp is invited. Christa is telling Vroni that her ex is invited.

Christa:	Da Hans	hod	**fei**	an	SEPP	ei'glon
	DET Hans	has	fei	DET	Sepp	invited
	'Hans (has) invited Sepp'					

The (verum) focus alternative to (10') is a set which contains only the members in (11).

(11) {Da Hans hod an Sepp ei'glon **, ¬** Da Hans hod an Sepp ei'glon}

This verum focus constrained set becomes clear in a context as in (12), where Maria provides other focus alternatives in (12 i and ii). The former gives an alternative to 'Sepp', the latter to the verb 'invite'.

(12) Vroni and Maria are talking about Hans' party. Sepp is Hans's best friend, but Vroni is not happy that he is invited, since she has no interest in seeing him.

Vroni:	Da Hans	hod	**fei**	an	SEPP	ei'glon
	DET Hans	has	fei	DET	Sepp	invited
	'Hans (has) invited Sepp'					

Maria:	Ja	wos	denn	sunst?	Häd'an	NED eilon	suin?
	DIP	what	DIP	otherwise	have.he.him	not invite	should
	'Well then, what else? Should he NOT have invited him?						

Maria i:	#Häda	an	Vinzenz	eilõn	soin?
	Have.he	det	Vinzenz	invite	should?
	'Should he have invited Vinzenz?				

ii.	#Häda	an	Sepp	bussln	soin?
	Have.he	DET	Sepp	kiss	should?
	'Should he have kissed Sepp?				

Maria's answers in (12i-ii), which provide contrastive focus possibilities are grammatical, yet not felicitous in this context. Only her offering the opposite polarity proposition as a retort is good in this context.

Also, note that unlike in the verum focus cases discussed in the previous section (3.1.1), the finite verb in *fei* sentences has no pitch accent associated with it, a requirement for the "canonical" verum focus cases. Nevertheless, I showed that a host proposition p is contrasted with some alternative ¬p when *fei* is added, without a change in pitch pattern.

3.2 Fei as a Discourse Particle

I showed so far that *fei* encodes a meaning along the lines of verum focus. In this section I claim that it is not enough to analyze *fei* as a special kind of focus particle (namely verum focus), but that its meaning encodes more than that (3.2.1). Following that I give a brief overview over the semantico-pragmatic function of discourse particles, and continue my argument in 3.2.2. by showing that *fei* accesses a proposition that seems to be assumed by the interlocutor to be in the common ground, and corrects the common ground with the polar opposite proposition.

3.2.1 Fei is not only Verum Focus

Fei shows strong verum focus effects. In the following I show that whereas that claim is consistent, it is only a part of the complete description of the particle. Consider (14), a conversation between two people.

(14) A: I glab' de Sechzga san recht beliebt in Minga.
I belive DET 1860 are pretty popular in Munich
'I believe that 1860 (a soccer club) is pretty popular in Munich'

B: De meist'n Muenchna san **fei** Bayernfans
DET most Munichers are fei fans.of. Bayern
'Most Munichers are (actually) fans of Bayern München (soccer team).'

In this example, B responds to A's belief that 1860 is popular, with an utterance containing *fei*. Under the verum focus analysis, this example should be analyzed as introducing the set of alternatives as illustrated in (15).

(15) $[[\text{De meist'n Münchna san Bayernfans}]]^{VF}$= {De meist'n Münchna san Bayernfans,
¬De meist'n Münchna san Bayernfans}

Nevertheless, the paraphrase *"it is not the case that most Munichers are fans of Bayern"* is clearly not what B wants to express in her answer. The answer in (14) asserts that most inhabitants of Munich *are* fans of the soccer club Bayern München, and moreover, B's answer implicates that A must not be aware of it. An appropriate paraphrase of B's answer in (14) is as in (16).

(16) ***I believe that you believe that it is not the case that*** *most Münchner are fans of Bayern.*

fei carries a presupposition, namely one about the interlocutor's beliefs, thoughts, or attitudes concerning the host utterance. In this case it is the presupposition that A doesn't seem to think that most Münchner are fans of a particular soccer club.

An answer expressing only verum focus as in (15) makes the dialogue infelicitous, i.e. B's response to A would be infelicitous if it accessed only the polar opposite proposition to the proposition at hand. Thus an explanation of the semantics of *fei* exclusively along the lines of verum focus cannot be the whole story, since it makes the wrong predictions about the data. There has to be another meaning component in *fei* that renders the conversation in (14) felicitous, and still captures the examples with *fei* previously shown. In the following section I show that the missing ingredient to a full understanding of the particle, namely the speaker's belief about the knowledge or beliefs of the interlocutor, is to be found in pragmatics of discourse particles.

3.2.2 Fei as a discourse particle

Discourse particles are linguistic expressions that anchor a host utterance to some aspect of the communicative situation that is proposed to be shared (=common ground) (Fischer 2006). They also express a speaker's epistemic stance or attitude toward the discourse context, in that they relate a host utterance to the shared common ground (=what is presupposed) (cf. Kadmon 2000). One distinct feature I take to be valid for all discourse situations is that the common ground does not necessarily have to be verbalized (cf. Fischer 2006). I take "implicit propositions" that are implicated by certain actions to be valid discourse antecedents (concrete examples will follow below). Also, unlike some focus particles, discourse particles do not affect the truth-functional meaning of a sentence (Abraham 1991), but its felicity conditions. This is a fact that also holds for *fei*, as earlier shown.

I propose that *fei* is an overt marker of the speaker's intent to correct the common ground shared between speaker and hearer (cf. Zimmermann 2007). This correction is based on evidence given to the speaker by the hearer, either by a verbal or non-verbal discourse antecedent. The speaker reacts with *fei* to an explicit or "implicit proposition", and corrects the common ground with the *fei* focused assertion: "I am asserting p, since judging from your behaviour/question/comment you seem to think ¬p, or just in case that you think ¬p". Consider the example in (17).

(17) Context: A puts out an elaborate spread for dinner for 2 without uttering an invitation

B: I hob **fei** koa Zeit mehr
I have fei NEG.DET time more
'I don't have time any more'

Proposition implicated by *A*'s setting the table for 2*: You have time for dinner*
Judging from your behavior I believe that you believe that I have time for dinner: but I don't have time for dinner. Corrects the common ground with: I DON'T HAVE TIME

In example (17), the speaker reacts to her friend's actions (setting the table for two) with a *fei*-focused assertion, which can be paraphrased with " you don't seem to realize, but I don't have time". The use of *fei* is a reaction to some action that suggests A and B are sharing the same common ground, the same assumptions about a specific situation, and corrects that assumption with the opposite (verum focus).

(18) shows the same, this time with an explicit discourse antecedent in the form of a question that suggests that everybody is warm enough, so a window can be opened (imagine it is winter).

(18) A : Can I open the window?'
B: Mi friats **fei**
Me be.cold fei
'I am cold'

Proposition implicated by A's question: *You are not cold*
Judging from your question I believe that you believe that I am not cold, but I am cold
Corrects the common ground with : I AM COLD

Here *fei* 'comments' on the implicature of the question, by correcting that implicature to the opposite and leading to a correction of the common ground.

As a last part of this line of argumentation I want to highlight a use of *fei* that at first sight seems incompatible with the suggestions made so far. This use is in out-of-the-blue contexts. The use if *fei* is attested in contexts where no explicit or implicit propositions have been put in the common ground. The scenario in (19) illustrates:

(19) Context: First thing said by a surprised aunt to her niece whom she hasn't seen in a year.
"Du bist **fei** ganz schee g'waggs'n!"
you are fei whole nice grown
'You have grown quite a bit'.
'*I believe that you believe that you haven't grown, you have grown quite a bit.'*
Corrects the common ground with: YOU HAVE GROWN QUITE A BIT

I treat the use of *fei* in these contexts a special case. I assume that that *fei* accesses more than explicit or implicit propositions in the common ground; *fei* accesses and can comment on readily observable facts *as long as the interlocutor is unaware of that fact*. A *fei*-focused proposition asserts that it should be part of the common ground, (and in the previous cases corrects an old, polar opposite, proposition), just in case the discourse partner didn't think it was in the common ground shared between them. *Fei* crucially cannot be used out-of-the-blue if the interlocutor is aware of what is asserted in the proposition (20).

(20) To a person who is shaking:
#Dich frierts *fei*.
you be.cold *fei*
To mean: *'You are cold'*
#'I believe that you believe that you are not cold, but you are cold'

In section 3 I argued that the BG particle *fei* is best analyzed as a verum focus discourse particle, a particle that corrects a proposition in the common ground by picking out the proposition with the opposite truth value. In the following section I will address some predictions that my proposal makes.

4 Predictions

My analysis of *fei* as a verum focus discourse particle makes several predictions. First, if *fei* accesses a presupposition in the common ground and picks out the opposite polarity of that presupposition, it should not be felicitous in answers to y/n questions (4.1). Secondly, if VERUM is encoded in C as proposed by Höhle (1992), and some discourse particles are modifiers on the propositional level (Zimmermann 2007b), *fei* should only be grammatical in inflected imperatives with CP structure. Infinitival imperative forms with the particle should be ungrammatical (4.2).

4.1 fei and Questions

The fact that someone asks a question implies that they do not know the answer to that question (rhetorical questions aside). A speaker asking a question does not update the common ground with an actual proposition. Since *fei* is a correction to a proposition that is in the common ground, the prediction is that it should not be possible as part of an answer to a question. This is borne out both in y/n questions (21) as well as in wh-interrogatives (22).

(21) Question: A*:* Schneibts draussn?
Snows.it outside
'Is it snowing outside?

Answer: B: # Ja, es schneibt fei.
yes, it snows fei
cannot mean: *you might not be aware that it is snowing, but it actually is snowing*.

(22) Question: A: Wer mog an Kafä?
who wants DET coffee?
'Who wants coffee?'

Answer: B: *# I mog fei an Kafä*.
I want *fei* DET coffee
cannot mean*: you might not be aware that I want a coffee, but I actually do want a coffee*

Next, consider the examples where the *fei* is part of the question itself. In (23), the y/n question with the particle is ungrammatical, as is the wh-question in (24). I take this to be due to the same reasons as above; a question is not an assertion, and since *fei* corrects the common ground, it is predicted to be only compatible with an utterance of the appropriate illocution type.

(23) #Schneibts fei draussn?
Snows.it fei outside
To mean' Is it snowing outside?

(24) # Wer mog fei an Kafä?
who wants *fei* DET coffee?
To mean 'Who wants coffee?'

Also consider example (25), where the question A asks carries a presupposition, yet that presupposition is not the polar opposite of B's answer; the dialogue is infelicitous.

(25) Context: A asks: Who all here is not cold? (presupposes: someone is not cold)
B: #Mi friats **fei** neda
me be.cold fei NEG
'I am not cold'

Compare this scenario with the felicitous (26).

(24) Context: A asks: Who all here is cold? (presupposes: someone is cold)
B: MI friats **fei** neda
me be.cold fei NEG
'I am not cold'

Note that the pronoun 'mi' needs to be focused (i.e. carry a pitch accent) for the answer to be felicitous. If the pitch accent is missing, the discourse would be infelicitous. I assume that this is due to the fact that with the contrastively focused pronoun, the question can be construed as carrying the implicature that B *IS* cold.

4.2 fei in Imperatives

If verum focus is encoded in CP, as suggested by Höhle (1992), and under an assumed analysis of some discourse particles as modifiers on the propositional level (Zimmermann 2004), the particle *fei*, as encoding both, might be syntactically situated within the root CP. Bayer (1991) states that discourse particles encode attitudinal meaning that cannot be activated unless the particle has access to a root clause. I thus predict that *fei* cannot occur in structures that lack the CP layer, such as infinitival commands. SG and BG have two major ways of forming commands; 'true' imperatives and infinitival commands. Only the imperative, as shown in (26), has the verb move to C. Evidence for the presence of a CP layer is the separable-prefix verb *'auf-bassn'*, which is separated due to the movement of the finite verb part to C. Compare with the uninflected, unmoved infinitival counterpart in (27), which has the same pragmatics as the inflected imperative in (26).

(26) Bass auf!
Watch out
'*Be careful!*'→imperative

(27) Aufbass'n!
Out.watch
'*Be careful!*'→infinitive

Data in (28a) shows that *fei* is compatible with the imperative, in fact this is a use of the particle that is widely attested in BG. (28b) shows that it is impossible to combine the particle with an infinitival command, due to the lack of CP structure.

(28) a. *Bass **fei** auf!*
Watch out
'Be careful!'→imperative

b. **fei aufbass'n*
fei out.watch
*→infinitive

In this section I showed that the proposed analysis of *fei* makes some predictions that are indeed borne out by the data. *Fei,* hosted in the CP layer of the clause, is incompatible with infinitival commands, which lack that layer. Lastly, the particle is ungrammatical in questions, nor can it be used in an answer to a y/n question. I took this to be due to an incompatibility between the illocution type of questions and the assertion expressed with *fei*.

5 Conclusion

In this paper I argued that the BG particle *fei* encodes both verum focus by contrasting the alternatives p and ¬p, and acts like a discourse particle since it comments on presuppositions in discourse, and corrects the common ground. I proposed that its meaning is best captured with the phrase: *I believe that you believe that it is not the case that **p***.

It is clear that the syntax of the BG particle has to be further investigated with respect to linearization, co-occurrence with contrastive and verum-focused verbs, and *fei*'s "home", (i.e. exact attachment site) in the clausal periphery. I briefly want to entertain an option for the identity of the maximal projection that can host *fei*. Based on data from Basque and English, Laka (1990) proposes the existence of a SigmaPhrase, a functional projection that hosts sentential affirmation and negation, and all elements that focus on the

truth-polarity of a sentence. Drubig (2000) extends Laka's analysis, and proposes two instantiations of SigmaP, which he calls PolarityPhrase 1 and 2. PolP1, corresponding to Laka's SigmaP, takes a VP complement, whereas PolP2 is located in CP and takes and IP complement. Drubig accounts for the differentiation of presentational focus (in PolP1) and contrastive focus (in PolP2). The fact that the use of *fei* introduces a contrast set (albeit limited to two members, p and ¬p), and the particle is located in CP, suggest that PolP2 could be a good candidate as functional projection that hosts the particle. An analysis like this would presuppose that the clausal periphery, the CP domain, mirrors the complexity of the IP/VP domains (Rizzi 1997). Varying interpretations of focus (or polarity) thus can be accounted for through functional projections in the respective domains.

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Non-traditional Dissemination of Fieldwork: From the Field to the World

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1 Introduction

We argue in this paper that adequate documentation is the basis for solid linguistic theory and that the dissemination of primary linguistic data from undocumented (and under-documented) languages is crucial to our discipline's future health. From comparative linguistics, to pedagogy, to natural language processing, the field of linguistics has its foundations in being a data-driven science. Language documentation and the dissemination of primary data should be a recognized scholarly activity within the field because these data sources provide the basis for broader linguistic analysis and external verification of analyses. A lack of scholarly and career-oriented reward for this work is detrimental to the discipline. In light of the current global crisis of rapid language loss, it is clear that if data collection and dissemination is not motivated, our scientific field of study will lack the rich diversity that it currently has, but that we do not have access to.

In this paper we present several examples of non-traditional dissemination of language documentation from small-scale and large-scale endangered language documentation projects. We present issues in the existing digital standards of data collection, digitization, and analysis. We discuss processes of data collection, transformation, digitization and dissemination, and we describe getting deliverables from fieldwork. Making field research available to both researchers and speech communities by following good practices helps create digital data that is accessible and enduring.

We present examples from both small and large-scale documentation projects. Our initial small scale projects included Fox's MA research on Walpole Island Ojibwe [xxx][1] on Walpole Island in Canada,[2] and the documentation of Mocho' [xxx] phonology.[3] Moran personally funded work on Western Sisaala [ssl] during a four month field trip to the Upper West Region of Ghana. We feel these projects are representative of a great deal of the linguistic research undertaken by individual researchers, especially early-stage graduate students. Much of the data which is most subject to obsolescence and loss is that collected by individual researchers on small-scale projects, as they often lack the monetary and technical support to transform their data into usable digital formats. Examples from large-scale projects include the large-scale comparative lexicographic database of the Dogon Languages of Mali Project;[4] and a digitization and fieldwork project on seven MesoAmerican languages at the Center for American Indian Languages (CAIL) at the University of Utah.[5]

2 Background

Linguistics is a data-driven science. Data is collected, analyzed, scrutinized and reanalyzed. The foundation of our discipline rests on this data collection and (re-) analysis. Traditionally, dissemination of

[1] We represent an Ethnologue/ISO 639-3 three-letter language code for each language within square brackets [].
[2] This research was funded in part by a thesis research grant from Wayne State University.
[3] This research on Mocho' phonology was funded by the Jacobs Research Fund of the Whatcom Museum.
[4] Funded by the National Science Foundation and the National Endowment for the Humanities. NSF award #0537435: Dogon Languages of Mali, Jeffrey Heath (University of Michigan), Principal Investigator. NEH Award: *Creating a Grammar, Dictionary, and Texts of the Dogon Languages of Mali, West Africa;* Jeffrey Heath, Principal Investigator.
[5] Funded by the National Science Foundation award #0513449: *Xinkan, Pipil, and Mocho': Bringing three endangered language documentation projects to completion*; Lyle Campbell, Terrence Kaufman, and Laura Martin, Principal Investigators.

linguistic research in documentary linguistics has been limited to print-based forms of publication such as grammars, dictionaries, or volumes of texts, which are found in libraries and private collections. Interesting language phenomena are also published in articles, papers in professional journals, conference proceedings and volumes of working papers. However, in these forms of publication, the written analysis is primary and unpublished language data essentially stays under the control of the researcher and is not completely published with the analysis.

Expanding potential uses of data naturally provides increased usability of data. For example, with the rise of the Internet as a medium for storing and sharing linguistic data, the Internet has become an important source for accessing linguistic data of all kinds. Our discipline should take hold of this and should encourage and reward the publication of unpublished linguistic data along side the researcher's analysis.

3 Why expand the traditional academic approach?

There is consensus in documentary linguistics of the importance of establishing a complete documentary record of a language under study (e.g., Himmelman 1998, Woodbury 2004). This is a time-consuming endeavor, but field linguists are curators of an archive of linguistic data that they collect and analyze. This is dire because the data they collect may be the only record of an endangered or extinct language. Such data should be made maximally accessible. By promoting dissemination of primary language data online, linguists can also provide accessibility to increasingly academically aware and Internet-connected communities of speakers. For example, the use of the '$100 laptop' to create grid computing over long distances, or the opening of the whitespace spectrum for Internet use, will have a great impact on getting Internet access to rural areas, where many disappearing languages are still spoken. This may have a positive impact on rural speaking communities' digital access to their language and the data that field linguists collect.

Expanding the traditional academic approach also provides primary data for new theoretical applications. Collaborative research with computational projects becomes possible. With the Internet, there is also much interest in combining pre-Web computational approaches with Web-based technologies. The processing of linguistic data using computers, so called *computer-assisted linguistics,* provides a great opportunity for collaboration and computer-aided analyses of large data sets. Large-scale data processing problems are state-of-the-art problems for other disciplines, such as Computer Science and Electrical Engineering.

4 Expanding usage domains

There are numerous problems with the traditional print-based dissemination approach. These include scarcity of print-based materials due to low demand for academic works on languages with small populations, or the scarcity of books and lack of reprints by publishers for markets of minority speakers. In publishers' defense, publishing costly print-based materials on scarcely spoken languages can be bad for business. It is not uncommon then, that field linguists provide supplemental funding for the publication of written materials for researchers and native speaking communities to have access to these materials.

Publishing data is of primary importance particularly because it provides accessibility, and in a sense archiving, of data that otherwise may not be shared. The inaccessibility of unpublished data is why archiving unpublished data in a widely accessible format is of primary importance. Expanding traditional approaches also allows for more flexibility and multi-purposing of data. For example, logically structured and annotated digital data can provide formats for inferring typological comparisons across large data sets. This does not distract from the original data's purpose, for example if it were published as a corpus of text or examples sentences. It does provide, however, other software and services the means to expand the data's usage.

Providing alternative ways to access data directly affects the longevity of data. Take as an example posting a linguistics paper online. If there is a link trail to that resource, it will be picked up and indexed by major search engines. It is often the case that this document will reside on servers of these services. A Word document or PDF of a linguistic analysis then becomes searchable (i.e. discoverable and accessible). If it is in a less-widely accessible format like PDF or Word, a search engine like Google typically makes an

HTML version[6] available to users that do not have proprietary software to view the document. Also, making the paper accessible online means that users may download and store copies. Digital data has the inherent quality that it is copiable. This helps provide longevity of the data because the same resource can be stored easily in various geographic locations. Alternative ways to access the data also provide longevity of data.

The potential audience also increases with expanded domains. This may include not only academic linguists, but speaker communities including native and fluent speakers, heritage speakers and language learners, community linguists, and language teachers. Also, increased data exposure provides data for sub-disciplines in linguistics, including discourse analysis, syntax, phonology, typology, corpus linguistics, and computational linguistics.

5 Quantifying documentation

In our experiences, the average field linguist spends a considerable amount of time collecting, transcribing and annotating, digitizing, and analyzing data. For example, it takes about one hour of labor to transcribe/translate one minute of spoken text in our experiences working with Mocho'. In the case of Xinka, about 40 lexical items can be input and analyzed per hour into a dictionary database. For fieldwork on Sisaala where access to electricity and a computer were not available, out-of-the-field digitization took over 100 hours to digitize 3000 lexical items with pertinent metadata. A fieldwork-based thesis is unquestionably more labor intensive than a literature-based thesis as it includes time-consuming data collection and data analysis in addition to the actual thesis write-up.

5.1 Types of data from fieldwork

There are several types of data collected during fieldwork. These may include raw recordings including audio, video and speaker writings (written-format texts created by native speakers). There may also be markup such as transcribed texts, lexical data, paradigms, descriptive notes by the researcher including speaker observations, and time-aligned annotations.

5.2 Standards

It is clear that the absence of standards results in unusable, unsharable or unsustainable data. As a pertinent comparison, take the establishment of a world-wide standard time. The concept of standard time was adopted to end confusion caused by different communities' use of their own (solar) time, which was disastrous and sometimes lethal after the development of rapid railway systems. The speed of travel provided by the railway caused confusion because there was a different local time kept by different communities (due to changes in longitude distances). In 1884, representatives from 27 countries met for the Meridian Conference and agreed upon and instantiated the 24 hour time zone systems that we use today. Thus making high speed travel safer and more reliable.

In linguistics, Bird and Simons' (2003) position paper rose awareness for the need for community discussion and consensus for endangered languages data formats. These standards, largely limited to technological advancements, are still under development and discussion. Standards are still emerging, and are not always determined by the ideal. Often there exists a dichotomy between technical adequacy and adoption. If prescribed standards are too technically difficult, critical mass is not reached and they can fail to be adopted. However, without standards we are left with a mess of legacy data in inaccessible formats. Inaccessible data from an extinct language is equally extinct as a language without speakers.

5.3 Standards and practical issues

As a solution to the problem of varying formats in textual linguistic data, projects such as the Text Encoding Initiative (TEI) and the E-MELD project[7] have responded by recommending certain structured

[6] The HTML version may have rendering problems, but such technologies continue to evolve.
[7] Electronic Metastructure for Endangered Languages Data, http://emeld.org.

languages (Standard Generalized Markup Language, SGML, and now eXtensible Markup Language, XML) to be used in conjunction with Unicode as an archival storage and annotation format.

Another textual-based standard is the set of Leipzig Glossing Rules for glossing interlinear texts. The standards for annotating and arranging linguistic data are straightforward and well maintained. However, the Leipzig Glossing Rules are not very well reflected in data found on the Web. For example, in the Online Database of INterlinearText (ODIN)[8] perhaps 40% of 120,000 samples of IGT follow the three-line format suggested by the Leipzig Glossing Rules.

An example of a practical issue regarding textual standards is the 'competition' between standards and implementations for interlinear glossed text (IGT). One model of IGT (Bow, Hughes and Bird 2003), recommends a 'suitable' XML representation, showing how the use of XML can be rendered through eXtensible Stylesheet Language (XSL, Bradley 2000) to create several presentation formats, such as PDF. Later specifications were proposed by Schroeter and Thieberger (2006) and by Palmer and Erk (2007). The former, The Ethnoer Online Presentation and Annotation System (EOPAS), is derived from the general model of IGT in Bow et al (2003) and includes elements and attributes for time alignment of text and audio/video multimedia files. EOPAS also includes attributes for cataloging and provides an Open Language Archive Community (OLAC)[9] namespace that provides access to an extended set of Dublin Core[10] metadata.

Any new approach or technology requires adoption by a substantial portion of the intended audience to survive. If too few in a community use the technology, then it will usually fail. TEI recommendations (using SGML) never caught on with the ordinary working linguist, likely due to the unavailability of tools at the time to edit and produce SGML. The situation with recent best-practice XML recommendations has been slightly better. However despite these efforts, it remains evident that the majority of linguists are still maintaining their traditional print-based approach.

Standards are necessarily a moving target in the digital age. Many standards, for example video archiving, are still emerging due to the technological and fiscal challenges they provide. There is a dichotomy between technical adequacy and adoption of standards. If a standard is technically difficult critical mass will not be reached. However, the motivation for standards are clear. The accessibility and longevity of data should be attained when possible. Common guidelines are emerging: these include using formats that are accessible and self-documenting, such as TIFF format for images. For texts, XML markup with a schema is an accepted best practice, but markup is also an area of contention. XML has been poorly adopted, primarily because of the lack of tools to easily produce XML markup for the ordinary working linguist, although the situation is improving with the introduction of XML-compliant annotation tools such as ELAN and SIL's Toolbox.

5.4 Dissemination

Putting textual materials online is an easy way to disseminate data and printable materials for researchers and users. Once completed, the descriptive materials produced by the Mesoamerican project (including dictionaries and grammatical descriptions of Xinka and Mocho') will be available for download in PDF format on the project website. Print-ready resources provide a way for language materials to be provided to the community even when the researcher is not physically present, and these materials can be printed and distributed if the community is not online. These materials can also be accessed by researchers, who need not wait for materials to be formally published.

For the Languages of the Dogon Project, comparative lexical data from seven related languages is available online through searchable interfaces for researchers. These data are also freely available to users with an Internet connection in form of PDF bilingual dictionaries. These materials are being continuously updated and added to as project members continue to collect data in the field.

Dissemination of recordings is also an easy method for sharing data with remote communities of speakers. Copies of recordings (for example, on CD or cassette) can be given directly to speakers after a session or they can be made available via the Web. There are several archives in existence for depositing digital recordings for long-term preservation, and many of them provide online access to materials. These include AILLA at the University of Texas, Austin; HRELP at the School of Oriental and African Studies in

[8] http://www.csufresno.edu/odin/
[9] http://www.olac.org
[10] http://dcmi.org

London; PARADISEC at the University of Melbourne in Australia; and the language archive at the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany.

Other online resources include annotated texts with audio or video recordings that can be displayed and streamed on the web, or provided for download. In addition, if text transcriptions are time-aligned with a video or audio recording, they can be displayed online, through a viewer such as EOPAS, or using a popular format such as QuickTime text or RealPlayer SMIL format.

6 Examples

6.1 Text handling

Xinka lexical data was stored in a FileMaker Pro[11] database, a common working format for linguists storing and analyzing field data. The FileMaker Pro database was transferred to Toolbox[12] via an XSLT stylesheet. Texts were time-aligned and transcribed in the ELAN annotation tool[13] and imported and glossed in the Toolbox database. A re-export of the database to FileMaker Pro updated the lexical entries with relevant new information stemming from the glossing process. This allowed printouts to be provided directly to the community and created a digital corpus suitable for other purposes, such as providing examples for the pedagogical grammar. These texts will be incorporated into the project website.

A corpus of typologically diverse example sentences in Sisaala was created in a plain text format. Python scripts were written to transform typed sentences into Unicode IPA, to format them according to the Leipzig Glossing Rules, and to covert the sentences to PDF for publication and dissemination. These sentences are being made available in PDF format on the Web and are being indexed in ODIN and thus available to academic scholars.

6.2 An academic and community website

The Dogon Languages project is a National Endowment for the Humanities and National Science Foundation funded project to document and describe the relatively unknown languages of the Dogon people spoken in Mali. It provides both field linguists and historical/comparative linguists with several interesting sources of data for linguistic analysis of the Dogon languages. For example, the project website[14] presents comparative lexicographic data from eight genetically related Dogon languages and it is being continually updated with new lexical data from researchers currently in the field. It also offers linguists pre-published grammars and interesting typological discussions.

The Dogon website offers other scientific disciplines and the public a broad range of data. For example, there is an in-depth ethnobotantical study of Mali flora and fauna with over one thousand images of species collected by Jeffrey Heath (U. Michigan) and his team. Videos and photos of lexical entries, cultural artifacts, and the Dogon peoples' surroundings are also provided on the website.

For language learning communities, the Dogon project offers free downloadable and printable bilingual dictionaries for the languages that the team is collecting data. This Dogon project is an ongoing project and continues to be updated with data collected and analyzed from the field. However, unlike traditional dissemination practices of withholding data until a comprehensive analysis and write-up can be completed or published, the primary data and analyses from the Dogon project are available on an ongoing basis and are more immediately available to the academic and native-speaking communities.

6.3 Collaboration

Another method for giving back to a language community is to hold cooperative workshops with community speakers and linguists who work with the language. Such collaboration can be fruitful for both parties. For example, at the community's request, a 'Placename Workshop' was held on Walpole Island to generate a list of place names from speakers. The workshop was recorded in video and photographs. This was particularly useful because gaps in one speaker's working knowledge of place names was filled in by other speakers' knowledge. The venue also provided an important training opportunity for community

[11] http://www.filemaker.com/
[12] http://www.sil.org/computing/toolbox/
[13] http://www.lat-mpi.eu/tools/elan
[14] http://dogonlanguages.org

members interested in filming video of native speakers and audio recording. Digital photos of collaborative maps were created for place name labels, creating rich resources for the community and researchers.

7 Conclusion

We have argued that adequate documentation is the basis for solid linguistic theory and that traditional methods of disseminating linguistics data are not adequate in today's digital world. Therefore, linguists that follow standards put forth by the field, and take the time to curate data – data that is central to linguistics as a discipline, since language data is the focal point of our field – should be rewarded with academic compensation. However, there is a divide between what a field linguist should be expected to accomplish, and what the tools will allow them to accomplish. This poses interesting challenges for the individual researcher, but should also be considered by tenure or hiring committees when evaluating professor candidates.

We have illustrated several projects that have disseminated primary linguistic data to the benefits of researchers and language communities. Documentation needs to be a recognized scholarly activity within the field. Archiving and presentation of Web-accessible data can and should be considered alternative forms of publication. For example, the citation of resources placed in archives or placed in an accessible format and registered with a recognized language archive. Primary data sources provide data for broader linguistic analysis, and also provide external verification of analyses. A lack of scholarly and career-oriented reward for this type of work is detrimental to the linguistics discipline. In light of the current global state of rapid language loss, it is becoming increasingly clear that if data collection and dissemination is not done right the first time, there may never be a second chance.

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Wh-Quantification: A Vietnamese Perspective

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1 Introduction[1]

Wh-indefinites or interrogative-based indefinites are common across-linguistically (Haspelmath 1997) and an attractive topic in the study of quantificational structures. Nishigauchi (1986, 1991), Cheng (1991, 1995) hold that wh-indefinites are variables, not quantifiers, and their universal force is derived from the operators that bind them. Shimoyama (2001), based on Hamblin's semantics of wh-phrases, assumes that a wh-indefinite introduces sets of alternatives. The wh-indefinite combines with other elements via pointwise functional application (see Rooth 1992), forming a constituent that serves as a restriction for the universal quantifier. Overall, these analyses share one common feature, namely, wh-indefinites are not quantificational inherently and their universal force derives from a universal quantifier.

We argue that these analyses cannot capture the wh-universal interpretations in Vietnamese and propose that wh-indefinites are existential quantifiers, derived from wh-phrases with additional morphology or occurring in a licensing context, for example, negation, generic, condition…. Their apparent universal interpretations are derived either from a generic operator quantifying over situations or a distributive operator quantifying over individuals. The latter introduces disclosure operators that wipe out the existential quantifiers, leaving the variables ready for the binding of the quantifier. The restrictive terms of the universal quantifiers are either the wh-indefinites as topics or the antecedent of a conditional sentence in which the wh-indefinites occur.

2 Wh-Quantification in Natural Language

2.1 Nishigauchi (1986, 1991)

Following Heim's (1982) analysis of indefinite NPs as variables, Nishigauchi holds that wh-indefinites in Japanese are not quantificational, but predicates with open variables, bound and derived quantificational interpretations from neighboring quantifiers. For example, a wh-indefinite such as *dare* 'who' is represented as *person (x)* and the universal interpretation of *dare mo* 'who-MO' in (1) is derived from *mo*, a universal quantifier, similar to English universal expressions of the form *every NP*, where the quantifier *every* takes the sister NP as its restrictive term.

(1) **Dare mo** ga nani-ka o tabe-te-iru.
who MO NOM what KA ACC eating-be
"Everyone is eating something."

Nishigauchi's analysis nicely captures the local case of the wh-indefinite and its associate, namely, when they are in sisterhood relation. However, a Japanese wh-indefinite can be associated with *mo* non-locally as shown in (2).

(2) **Dare ga** ki-te **mo**, boku wa aw-a-nai.
who NOM come MO I Top meet-not
"For all x, if x comes, I would not meet x."

In (2) *mo* is not attached directly to the wh-indefinite, but to a clause in which the wh-indefinite *dare* is embedded. Nishigauchi assumes that the semantic properties of this wh-indefinite appear to be the same as

[1] I would like to thank the audience at the 24th Northwest Linguistics Conference, the babblers of SemBabble at University of California San Diego, and Ivano Caponigro, for a number of improvements in this paper.

in local cases and that in the example above, *mo* stays in the head C. In order for *mo* to bind the wh-indefinite, the former must govern the latter. To solve the locality problem, Nishigauchi proposes a movement account, according to which, the wh-indefinite moves covertly to Spec, CP and forms a Spec-head relation with *mo* and is governed by *mo*, a structural realization of unselective binding.

2.2 Shimoyama (2001)

Shimoyama argues that the movement analysis above does not explain satisfactorily the island puzzle in Japanese, as in (3).

(3) [[ø [Yamada-ga **dare**-ni **nani**-o okutta **ka**] sitteiru] syoonin]-**mo** damatteita.
[[[Yamada-Nom who-Dat what-Acc sent Q] know] witness]-MO was_silent
a.*"The witness who knew what Yamada sent to whom was also silent."*
"Even the witness who knew what Yamada sent to whom was silent."
b.* *"For every person x, the witness who knew what Yamada sent to x was silent."*
c.* *"For every thing x, the witness who knew to whom Yamada sent x was silent."*
d.* *"For every person x, for every thing y, the witness who knew whether Yamada sent y to x was silent."*

The absence of the interpretations b, c, and d in the example above suggests that the wh-indefinites *dare* 'who', *nani* 'what' inside the embedded question, a wh-island, cannot be associated with *mo*. By contrast, the association of the CNP island-embedded wh-indefinite *dare* 'who' with *mo* is unproblematic as shown in (4).

(4) [[[[**Dono** T.A.-ga ø osieta] gakusei]-ga ø syootaisita] sensei]-**mo** kita.
which T.A.-Nom taught student -Nom invited teacher -MO came
"For every T.A. x, the teacher(s) that the student(s) that x had taught invited came."

If the wh-indefinites undergo covert movement as Nishigauchi proposes, then why does this movement obey wh-islands, but not CNP islands? The alternative analysis proposed by Shimoyama is based on Hamblin semantics for wh-phrases, where wh-phrases such as *who* and *what* denote sets of individuals. For example, in (5) the wh-indefinite *dare* 'who' denotes a set of human individuals and the VP *odorimasu* 'dance' denotes a singleton set whose only member is its ordinary denotation. Applying functional application in a point-wise manner, that is, applying the function λx λw' [dance (x) (w')] to each member of the set of human individuals, we have the set of propositions in (5b), which is the denotation of a question in the semantics of Hamblin (1973) and Karttunen (1977).

(5) a. [**Dare**-ga odorimasu] **ka**?
who-Nom dance Q
"Who dances?"
b. $[[\text{ **Dare-ga odorimasu** }]]^{w,g}$ = {f(x): f∈ $[[\text{ **odorimasu** }]]^{w,g}$, x∈ $[[\textbf{dare-ga}]]^{w,g}$ }
= {λx λw' [dance (x) (w')]: person (x) (w)}

Extending this analysis to universal constructions with *mo*, Shimoyama assumes that the domain of quantification for *mo* is provided by its sister constituent, not the embedded wh-indefinite. Thus the universal quantification in the non-local case in (6) is over the set of mothers of some student or other as in (7a), not over the set of student as in (7b).

(6) [**Dono** gakusei-no okaasan] -**mo** odotta.
which student-Gen mother- MO danced
"Every mother of some student or the other danced."

(7) a. ∀x [x∈{ι y [mother (z) (y)]: student (z)}→ dance (x)]
b. ∀x [student (x) →dance (ι y [mother (x) (y)])]

The denotations in (7a, b) express the same truth conditions. However, the analysis in (7a) can account for the grammaticality of the universal quantification of complex NP with embedded wh-indefinites without

any movement. The phrase that combines with *mo* denotes a set of alternatives, and serves as a direct restrictor of *mo*, whose semantic contribution is in (8).

(8) For $[[\alpha]]^g \subseteq D_e$,
$[[\alpha$ **mo**$]]^g = \{\lambda P \forall x [x \in [[\alpha]]^g \rightarrow P(x) = 1]\}$

How does her theory explain the wh-island puzzle? Shimoyama proposes that the wh-island effect is expected from the architecture of the interpretation system: The alternatives introduced by the wh-indefinites expand until they meet the first operator of the relevant kind, that is, the one that takes Hamblin denotation as its first argument. In the case of wh-islands, the first *ka* the wh-indefinites meet takes sets of alternatives and returns singleton set, and thus the structure formed by the wh-indefinites cannot be accessible from the higher particles. To put it differently, the association of the higher particles with the wh-indefinites is blocked by the lower particles in the wh-islands, while the complex NP is free from this blocking, as summarized below.

(9) a. * […. […. wh-indefinites …]-ka/mo ….]-**ka/mo**
b. […. […. wh-indefinite ….] $_{CNP}$]-**ka/mo**

2.3 Cheng (1991, 1995)

Cheng (1991, 1995), following Nishigauchi (1986, 1991) and Heim (1982), proposes that wh-indefinites in Chinese are indefinite NPs without any inherent quantificational force and obtains quantificational interpretations from neighboring operators. Like wh-indefinites in Japanese, wh-indefinites in Chinese can be interpreted as universally quantified expressions in association with their binders as illustrated in (10).

(10) Botong **sheme dou** chi.
Botong what all eat
"As for Botong, he eats everything."

Unlike Japanese wh-indefinites, however, a wh-indefinite in Chinese is a polarity item and an indefinite, so it requires both a trigger to license it as a polarity item (for example, the negative marker, or a question particle) and a binder to determine its quantificational force, as exemplified below.

(11) a. Jialuo mai-le **sheme ma**.
Jialuo buy-ASP what Q
"Did Jialuo buy anything?"

b. Jialuo **mei-yo** mai **sheme**.
Jiaoluo not-have buy what
"Jiaoluo did not buy anything."

In the examples above, Cheng proposes that the instances of the wh-indefinite *sheme* are bound by a covert existential quantifier introduced by the rule of Existential Closure (Heim 1982, Diesing 1990), but they have different triggers: The yes-no question particle *ma* in (11a) and negative marker *mei-you* in (11b). Wh-universals in Chinese are similar to those in Japanese in that the wh-indefinite can be adjacent or non-adjacent to its licensor/binder. Yet, unlike local wh-universals in Japanese, in Chinese the wh-indefinite and its licensor do not form a quantificational phrase (QP) as Nishigauchi's analysis. On Cheng's hypothesis the binder *dou* is an adverb, adjoining to an Asp' to m-command the wh-indefinite to license it. This analysis accounts for the following data.

(12) a. * **Shei** gei Lisi **dou** xie-le xin.
who to Lisi all write-ASP letter
"Everyone wrote a letter to Lisi."

b. **Shei dou** gei Lisi xie-le xin.
who all to Lisi write-ASP letter
"Everyone wrote a letter to Lisi."

In the sentence (12a), the intervening PP, adjoined to V' or VP, prevents *dou* from adjoining to Asp', so *dou* must adjoin to V'. This is not a configuration for m-commanding. By contrast, in (12b), *dou* is not intervened by the PP, so it can adjoin to Asp' and be able to m-command the wh-indefinite. The sentence is grammatical.

Now let us see what happens in cases where the wh-indefinite and *dou* are not adjacent to each other. Consider the sentence (13a) below, from Cheng (1995).

(13) a. **Shei** chi **shenme dou** gen wo wuguan.
who eat what all to I irrelevant
"Whoever eats whatever is irrelevant to me."
"Whatever pairs of x and y such that x eats y are irrelevant to me."
b. Ni jiao **shei** jin-lai, wo **dou** jian ta.
you ask who come in, I all see him/her
'Whoever you ask to come in, I will see him/her (the person who you ask to come in).'

Sentence (13a) is likely to be structurally similar to (13b). Cheng and Huang (1996) analyze (13b) as *dou*-conditionals and propose that (13b) involves elliptical embedded questions because the antecedent clause can be fully spelled out with the question embedded under the subordinating conjunction *bulun* 'regardless of'. They assume that this conjunction selects an interrogative proposition as its complement. On their analysis, the wh-indefinites in (13b) are not variables, but existential quantifiers. The antecedent in (13b) is an embedded question, over which *dou* quantifies, and thus contributes the universal quantification.

Their analysis of non-local wh-universals, at this point, leaves us an internal-theory question regarding the licensing of the wh-indefinites in the sentential subject in (13a, b) given that *dou* in these sentences does not m-command the wh-indefinites.

3 Wh-Quantification in Vietnamese

3.1 Wh-universals with ai nấy and ai cũng

As is well known in Chinese and Japanese, a wh-indefinite can obtain a universal reading when it is associated with another element, for example, *dou* in Chinese and *mo* in Japanese. In Vietnamese these elements are *nấy* and *cũng*. Examples where a universal interpretation arises when a wh-indefinite occurs along with these elements are given in (14a, b).

(14) a. **Ai cũng** vui vẻ.
who CUNG happy
"Everyone is happy."

b. **Ai nấy** vui vẻ.
who NAY happy
"Everyone is happy."

Without *nấy* or *cũng*, no universal interpretation obtains: (14c) is at best interpreted as a wh-question.

c. **Ai** vui vẻ.
who happy
*(Intended) *"Everyone is happy."*
"Who is happy?"

Despite their similarity in the quantificational interpretation suggested by the translation, these universal expressions should be analyzed as belonging to two distinct constructions because they are different with respect to morphological make-ups and syntactic behavior as shown in the following constituency test. The test is based on the assumption that if an expression is a constituent it will not allow any exotic element to tamper with its constituent structure. In Vietnamese, the sentential adverb *rồi* 'eventually/ then' occurs sentence-initially in (15b) and in post subject position in (15a). Inserting this adverb inside the NP will result in ungrammaticality (15c).

(15) a. [$_{DP}$ Các sinh viên này] **rồi** sẽ ra đi.
PLU student DEM then will leave
"Eventually, these students will leave."
b. **Rồi** [$_{DP}$ các sinh viên này] sẽ ra đi.
then PLU student DEM will leave
"Eventually, these students will leave."
c.* [$_{DP}$ Các sinh viên **rồi** này] sẽ ra đi.
PLU student then DEM will leave
"Eventually, these students will leave."

The examples in (16) suggest that *ai* 'who' and the element *cũng* do not form a constituent in that this adverb can appear between them.

(16) a. **Ai** rồi **cũng** sẽ ra đi.
who then CUNG will leave
"Eventually, everyone will leave."

b. Rồi **ai cũng** sẽ ra đi.
then who CUNG will leave
"Eventually, everyone will leave."

The expression *ai nấy* illustrates an opposite pattern: A sentential adverb cannot occur in between a wh-indefinite and *nấy*.

(17) a. ***Ai** rồi **nấy** sẽ ra đi.
who then NAY will leave
"Eventually, everyone will leave."

b. Rồi **ai nấy** sẽ ra đi.
then who NAY will leave
"Eventually, everyone will leave."

The test indicates that *ai nấy* is a constituent composed of the wh-indefinite *ai* 'who' and the element *nấy*. By contrast, *ai cũng* is obviously composed of two distinct constituents. While it is not clear whether *nấy* and *cũng* are universal quantifiers or not, their obligatory co-occurrence with the wh-indefinite in universal contexts suggests they function as a licensor of the non-interrogative wh-indefinite.

3.2 Syntactic Behavior of ai cũng and ai nấy

We have seen that the expressions *ai cũng* and *ai nấy* are morphologically different: While the latter is a constituent, the former is not. Syntactically, these expressions demonstrate distinct properties as well. First, at the descriptive level, *cũng* requires the argument it associates with occur to its left.

(18) a. Tân **cũng** thích **ai**.
Tan CUNG like who
"Who does Tan also like?" (* *"Tan likes everyone."*)
b. **Ai** Tân **cũng** thích.
who Tan CUNG like
"Tan likes everyone."
c. **Ai cũng** thích Tân.
who CUNG like Tan
"Everyone likes Tan." "Who also likes Tan?"

Secondly, *cũng* is associated with one wh-indefinite at a time, and with the closest one.

(19) Ai **cái gì cũng** mua.
who what CUNG buy
"Who bought everything?"
* *"What did everyone buy?"*
* *"Everyone bought everything."*

The behavior of *cũng* suggests that its relation with the wh-indefinite obeys some configuration constraint. Wh-indefinites with *nấy* follow a stricter constraint. This form must be base generated in subject position: Neither fronting *ai nấy* from object position to sentence-initial position, nor keeping it in object position yields grammaticality.

(20) a. *Tân gặp **ai nấy**.
Tan meet who NAY
b. ***Ai nấy** Tân gặp.
who NAY Tan meet
(Intended) *"Tan met everyone."*
c. **Ai nấy** gặp Tân.
who NAY meet Tan
"Everyone met Tan."

In summary, in local wh-universals in Vietnamese, where a wh-indefinite and its associates are sisters, the associates *nấy* and *cũng* illustrate distinct syntactic behavior with respect to their association with the wh-indefinites.

3.3 Wh-Existential with ai and ai đó́

Like those in Chinese and Japanese, Vietnamese wh-indefinites can obtain existential interpretations. When it is without additional morphology, it need a licensor and is scopally lower than its licensor (21a). When it is with additional morphology or an indefinite marker in Haspelmath's terminology, namely *đó́*, it does not need a licensor (21b).

(21) a. Tân **không** gặp **ai**.
Tan not meet who
"Tan did/does not meet anyone."

b. Tân gặp **ai đó**.
Tan meet who DO
"Tan met/meets someone."

The element *đó́* is a demonstrative, meaning 'that' as in the object noun phrase in (21c), where an adjective occurs between the noun and the demonstrative. However, when the demonstrative co-occurs with the wh-indefinite, no adjective is allowed to appear between them as in (14d). This behavior suggests that *ai đó́* is a constituent, namely, *đó́* functions as an affix attached to the stem *ai* 'who'.

c. Tân gặp [cô gái trẻ **đó**].
Tan meet CL girl young DO
"Tan met/meets that young girl."

d. *Tân gặp [**ai** trẻ **đó]**.
Tan meet who young DO
"Tan met/meets someone young."

Note that the wh-indefinite in (21b) can be interpreted as a specific indefinite. Following Schwarzschild (2004), we assume a pragmatic account for this reading, according to which the specific indefinite reading of the wh-indefinite obtains when the domain of the existential quantifier is reduced to a singleton set.[2]

In conclusion, Vietnamese wh-existential expressions can surface with or without additional morphology. When without additional morphology, they need a licensor. When they are with additional morphology, no licensing is required. The questions are, can the theories we just reviewed account for the data in wh-existential as well as wh-universal in Vietnamese?

4 Can the Current Theories Account for Vietnamese?

The answer is no. The theories we have reviewed do not provide any answer to the questions below.

(a) Why must *ai nấy* 'who-NAY' be base-generated in subject position?
(b) Why must a wh-indefinite appear sentence-initially in its association with *cũng*?
(b) Why does the wh-indefinite without additional morphology require licensing, but the one with additional morphology does not?

In addition, with respect to non-local wh-universals, neither the Unselective Binding theories by Nishigauchi and Cheng nor Shimoyama's theory explains the CNP island contrast below: (22a) is not grammatical while (22b) is. If *cũng* is a quantifier, unselective binding the embedded wh-indefinite as Nishigauchi and Cheng propose or is a quantifier taking the constituent embedding the wh-indefinite as its argument on Shimoyama's theory, then (22a) should be as grammatical as (22b), contrary to fact.

(22) a. *[Quyển sách Tân mua cho **ai**] **cũng** hay.
CL book Tan buy for who CUNG interesting
"For all x, x is a person, the book Tan buy/bought for x is interesting"

[2] See Reinhart (1997) and references therein for different views on specific readings of indefinite NPs.

b. [Sách Tân mua cho **ai**] **cũng** hay.
book Tan buy for who CUNG interesting
"For all x, x is a person, the book Tan bought for x is interesting"

Finally, if we follow Shimoyama's analysis and regard *nấy* as a quantifier, then how can we account for the fact that this element can surface in sentence final position as in (23b), given that on that analysis, *nấy* takes the constituent embedding the wh-indefinite as its first argument, not the wh-indefinite?

5 Proposal

With respect to question (c) in section 4, we propose that a wh-indefinite is not a variable, but an existential quantifier. If a wh-indefinite occurs as a constituent with another element (*nấy* and *đó*) it is not subject to licensing. Otherwise, it needs to be in a downward entailing context to be licensed; for example, it is licensed by a generic operator, or by a conditional operator. Regarding the questions (a) and (b) note that Vietnamese is a 'topic-prominent language', namely, topic plays a more prominent role than subject. Topic can be base-generated or left-dislocated in sentence-initial position. We assume that wh-indefinites in universal contexts are either topics or appear in a subordinating clause that is a topic.

Let us see how this proposal works in the following examples.

(23) a. **Ai nấy** gặp Tân.
whoNAY meet Tan
"Everyone met Tan."

b. Anh nấu **gì** tôi ăn **nấy**.
you cook what I eat NAY
"I eat whatever you cook."

An obvious question naturally arises when we encounter the sentences in (23): How do these sentences with existential expressions come to be interpreted universally? For example, (23a) should mean something like 'A person met Tan' rather than 'Every person met Tan.' To answer this question, first note that this form can occur with a distributive operator as shown in (24a). Following Dekker's (1993) Existential Disclosure and Chierchia's (2000) amendment of Cheng and Huang's (1996) analysis of Chinese bare conditionals, we propose that the distributor *đều* 'all' is a universal quantifier with a disclosure operator or λ-abstractor: *đều* = ∀ λ x_1 . The form *ai nấy* moves to the topic position, Spec, TopP, from the base-generated position, Spec, TP. This movement ends up forming the restriction on the quantifier, creating another λ-abstractor with the trace being a variable bound by the quantifier (24c). The application of Existential Disclosure (ED) wipes out the existential quantifier, leaving the variable bound by the universal quantifier (24d).

(24) a. **Ai nấy đều** gặp Tân.
whoNAY all meet Tan
"Everyone met Tan."
b. [$_{TopP}$ **Ai nấy**$_j$] [$_{TP}$ t_j **đều** gặp Tân].
c. ∀ (λ x_1 ∃ x_1 [x_1 is a person] λ x_1 [x_1 met Tan]) ED→
d. ∀ x [x is a person] [x met Tan]

The analysis above accounts for the local universals. What happens in non-local universals, for example, in a sentence such as (25)? We analyze the sentence in (25) as a conditional sentence and the antecedent is the topic (see Haiman 1978, Chierchia 1992). This type of conditionals can optionally take a distributive operator, where *đều* appears pre-verbally in the consequent.[3]

[3] The following data establish that *đều* is a distributive operator.
a. Chúng tôi dùng chung một phòng tắm.
we use together one bathroom
"We share a bathroom." (One bathroom for all of us)
b. Chúng tôi đều dùng chung một phòng tắm.
we DEU use together one bathroom
"We all share a bathroom." (Each of us shares a different bathroom with the other.)
c. Tôi (*đều) dùng chung một phòng tắm.
I DEU use together one bathroom

(25) a. [Anh nấu **gì**] [tôi **đều** ăn **nấy**].
you cook what I all eat NAY
"I eat whatever you cook."

Following Tran (2005), Bruening and Tran (2006) we propose an analysis based on Nunes (2001)'s 'Sideward Movement' to account for this non-local relation. Briefly, the derivation of the sentence in (25a) is as follows. First, let us hold the numeration for (25a) is as in (25b). The derivation starts with the operation of *copy and merge* as in (25c), then, the *form chain* operation (25d), followed by *chain reduction* (25e).

(25) b. N = { anh $_{you}$, nấu $_{cook}$, tôi $_{I}$, gì nấy, đều $_{all}$, ăn $_{eat}$ }
c. COPY and MERGE
- First, derivation of the main clause by merging the quantified expression with the verb: [tôi $_{I}$ đều $_{all}$ ăn $_{eat}$ gì nấy]
- Second, construction of the adjunct by making a copy of [gì nấy] and merging the copy as the argument of the verb 'cook': [anh $_{you}$ nấu$_{cook}$ gì nấy]
- Third, merging the CP adjunct with the main clause previously formed: [$_{IP}$ [$_{CP}$ [anh $_{you}$ nấu$_{cook}$ gì nấy]] [$_{IP}$ tôi $_{I}$ đều $_{all}$ ăn $_{eat}$ gì nấy]]

d. FORM CHAIN: [$_{IP}$ [$_{CP}$ [anh $_{you}$ nấu$_{cook}$ gì nấy$_{i}$]] [$_{IP}$ tôi $_{I}$ đều $_{all}$ ăn $_{eat}$ gì nấy$_{i}$]]

e. CHAIN REDUCTION: [$_{IP}$ [$_{CP}$ [anh $_{you}$ nấu$_{cook}$ gì ~~nấy$_{i}$~~]] [$_{IP}$ tôi $_{I}$ đều $_{all}$ ăn $_{eat}$ ~~gì~~ nấy$_{i}$]]

The lack of c-command is likely to be the reason why the two copies are pronounced. On Nunes's theory, copy-deletion is subject to Kayne (1994)'s LCA , according to which relation between hierarchical structure and linear order is rigidly fixed: asymmetric c-command maps into linear order. For no copy c-commands the others, nothing prevents both copies from being pronounced, one of which is a minimal copy.

The interpretation of non-local universals is similar to that of local universals. Namely, *đều* 'all' is a universal quantifier with a disclosure operator or λ-abstractor: *đều* = ∀ λ x_1. The sideward movement of *gì nấy* from the consequent to the antecedent creates another λ-abstractor with the trace in the consequent being as a variable bound by the quantifier. The application of Existential Disclosure wipes out the existential quantifier in the antecedent, leaving the variable bound by the universal quantifier.

(26) a. [Anh nấu **gì** $_{j}$] [tôi **đều** ăn **nấy** $_{j}$].
you cook what I all eat NAY
b. ∀ (λ x_1 ∃ x_1 [you cook x_1] λ x_1 [I eat x_1]) ED→
c. ∀ x [you cook x] [I eat x]

In summary, the universal interpretation of the wh-indefinites with *nấy* derives from a distributive operator *đều* 'all' equipped with a disclosure operator or λ-abstractor.

We have observed that wh-indefinites with *nấy* differ from wh-indefinites with *cũng* with respect to constituency and syntactic behavior and that the distributive operator *đều* is optional in the wh-universals with *nấy*. Yet the occurrence of *cũng* in wh-universals is obligatory. Following Chierchia's (1992) analysis of adverbs of quantification and adopting Heim's (1990) situation-based semantics, we assume that the local as well as non-local wh-universals with *cũng* as in (27) and (28) derive from a universal quantifier over situations introduced by *cũng*. The wh-indefinites in local wh-universals are topics, base-generated in

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"I share a bathroom."
First, *đều* allows only the distributive reading when used with a predicate ambiguous between the collective and distributive readings as illustrated by the distinct interpretations between (a) and (b). Second, it never co-occurs with a singular subject (c).

the Spec, Top P. The topic *ai* 'who' extends its semantic domain over the empty category in the subject and object position of the verb 'help', as illustrated in (27b) and (28b).[4]

(27) a. **Ai cũng** giúp AnhThơ.
who CUNG help AnhTho
"Everyone helps AnhTho."
b. [$_{TopP}$ **Ai** [$_{TP}$ *e* **cũng** giúp AnhThơ]].
c. ∀s [∃x x is a person in s] [∃s' s ≤ s' the person in s helps AnhTho in s']

(28) a. **Ai** AnhThơ **cũng** giúp.
who AnhTho CUNG meet
"AnhTho helps everyone."
b. [$_{TopP}$ **Ai** [$_{TP}$ AnhThơ **cũng** giúp *e*]].
c.∀s [∃x x is a person in s] [∃s' s ≤ s' AnhTho helps in s' the person in s]

The topics in the sentences above serve as a restriction for a universal quantifier over situations. It is well-known in the literature that NPIs are licensed when they appear in the restriction of a universal quantifier, typically over individuals (Ladusaw 1979, Lahiri 1998). There is no reason to rule out the possibility that wh-indefinites are licensed in the restriction of a universal quantifier over situations. However, it is more plausible to assume that *cũng* is a generic operator by which wh-indefinites are licensed.[5] In this case, the empty category is interpreted as an e-type pronoun. Thus we have (27c) and (28c) as the logical representations of (27a) and (28a).

This analysis can be extended to the non-local case in (29a), in which the wh-indefinite is base-generated in the antecedent of a conditional sentence, which is a topic, and the empty category in the consequent is an e-type pronoun as shown in (29b). The semantic representation of this sentence is as in (29c).

(29) a. Anh nấu **gì** tôi **cũng** ăn .
you cook what I CUNG eat
"I eat whatever you cook."
b. [$_{CP}$ Anh nấu **gì**] [$_{TP}$ tôi **cũng** ăn *e*].
c.∀s [∃x x is a thing in s & you cook x in s] [∃s' s ≤ s' I eat in s' the thing you cook in s]

6 Conclusion

Current typological study of indefinites (Haspelmath 1997) indicates that a wh-indefinite is cross-linguistically derived either from affixation, namely by having the wh-phrase affixed with an indefinite marker or from conversion, namely the wh-indefinite is identical to the wh-phrase. The Vietnamese data fit nicely into this typological picture. However, it would be more elegant if we propose that a wh-indefinite, in fact, is composed of a wh-phrase and an indefinite marker. And an indefinite marker can be covert or overt. If covert, it needs to appear in a licensing context. We propose further that a wh-phrase is composed of a wh-element, a quantifier and a restriction on the quantifier. The wh-element is responsible for the

[4] A topic can extends its semantic domain over the rest of the sentence and controls topic deletion., That is, the empty categories *e* in (a) all refer to the topic 'this apricot' (see Tsao 1979, Huang 1984, Portner and Yabushita 2001).
a. Cây mai này, *e* lá to, *e* hoa nhỏ, *e* mắc tiền, tôi không mua *e*.
tree apricot DEM leaf big flower small expensive, I not buy
'This apricot, its leaves are big, its flowers are small, it is expensive, I won't buy it.'

[5] The example below illustrates that *cũng* is a generic operator.
a. Ai có tiền cũng đi chơi.
who have money CUNG go play
"Anyone who has money goes out enjoying themselves."
As indicated by the translation (a) is generically interpreted, namely it expresses the way things are. See Dayal (1998) for a situation-based semantics of the generic 'any'.

interrogative use of the wh-phrase. In order for a wh-phrase to be used non-interrogatively, this wh-element must be suppressed. The function of the indefinite marker, covert or overt, is to suppress this wh-element.

Regarding the contrast in grammaticality in (22), we propose a percolation analysis in the spirit of Nishigauchi (1991), namely, the wh-feature of the embedded wh-phrase percolates up to the CP, then from CP to the head of the complex NP. As a noun phrase headed by a classifier in Vietnamese tends to be construed as definite, the ungrammaticality of (22a) is due to a conflict between the definiteness of the noun phrase in (22a) and the requirement that *cũng* take a constituent with [+wh] as its restriction. By contrast, the complex NP in (22b) is without a classifier and is unspecified with respect to definiteness; that is why it can take the percolated wh-feature and qualifies as a licensee of *cũng*; hence, (22b) is grammatical.

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Surface Structure Constraints and Wh-Questions in English

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1 Introduction

In English the wh-word (or interrogative word) in the canonical question form appears preposed, at the front of the sentence. In such a question, there is an empty argument position later in the sentence at which the wh-word is to be interpreted. Following Fodor (1978) we will refer to such questions as *filler-gap* sentences. The preposed wh-word is called the *filler*, which must be interpreted at an empty syntactic position (called the *gap*) later in the sentence. Several researchers, especially Ross (1967), Chomsky (1973) and Huang (1982) have noted constraints (often called *locality constraints*) on where the gap can occur in sentences of English[1].

This paper will be concerned with deriving three of these constraints from general principles. These general principles are much simpler than those in previous analyses, they are statable in terms of surface structure and they can be motivated on grounds of parsing feasibility. Further, these general principles predict other, attested examples of unacceptable sentences, a fact which attests to their generality.

The first type of locality constraint under consideration is Ross' (1967) "Complex Noun Phrase Constraint" (CNPC), which bars a gap from occurring inside an S which is dominated by an NP, as in (1)a. (In what follows, the gap will always be represented by the symbol t_i. t_i is co-indexed with the wh-word which is to be interpreted in its place.) The second is Ross' "Sentential Subject Constraint" (SSC), which bars a gap from occurring inside a sentential subject, as in (1)b. The third is Huang's (1982) "Adjunct Condition", which will henceforth often be referred to as the "Adjunct Island Constraint" (AIC), which bars a gap from occurring inside an adjunct[2], as in (1)c.

(1)

a. * What$_i$ did Max like [$_{NP}$ the boy [$_S$ who ate t_i]]
b. * What$_i$ did [$_S$ for Ernie to win t_i] seem unlikely
c. * What$_i$ did Bush order the attack [$_{PP}$ after [$_S$ Saddam mentioned t_i]]

We will have need of a convenient label for the three constraints under discussion and, for lack of a better name and for the purposes of this document alone, let us refer to these three constraints collectively as the *RH constraints* (i.e. the Ross-Huang constraints).

The major early approaches to reducing the RH constraints to more general principles, such as Chomsky 1981, 1986, Huang 1982 and Rizzi 1990, posited that ungrammaticality arose due to facts about (or at least stated in terms of) the derivation of a sentence.

We will show that simple, general principles can predict (a more accurate variant of) the RH constraints as well as other attested behavior and that these principles can be stated without reference to facts about the derivation. That is, *these general principles can be stated in terms of the surface structure of the sentence alone.*

[1] In their terms they gave constraints on 'movement' or 'extraction' of the wh-word, which they held to begin in its canonical position. However, the assumption that syntactic items 'move,' in some meaningful sense, during the production of an utterance is a theory internal-one. While it may be correct, our account of wh-constraints does not need to prejudge the issue and so is stated in a filler-gap framework, which is desirable because it the theory can be stated in terms of (presumably theory-neutral) facts about surface structure.

[2] Here, adjunct positions are equated prepositional phrases that are directly dominated by sentences.

2 The Analysis

Following Chomsky 1957, we will analyze sentences as strings of words contained in recursively-embedded constituents so that each sentence corresponds to a (graph-theoretic) tree where terminal nodes correspond to words and non-terminal nodes correspond to phrases.

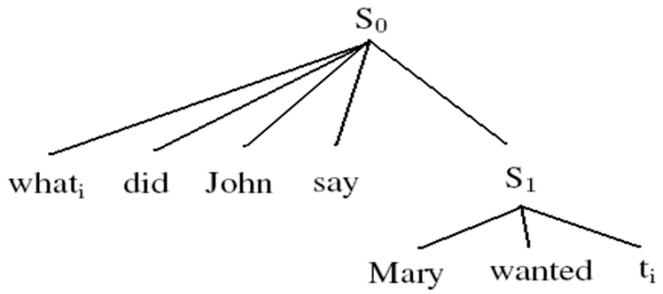
Unlike modern descendants of Chomsky 1981, however, we will make use of only four phrasal categories: Sentence (S), Noun Phrase (NP), Prepositional Phrase (PP) and Adjective Phrase (AP). That is, all internal nodes on the tree will bear a label of one of these types.

Recall that the 'gap' in a filler-gap question is the 'empty syntactic position at which the wh-word must be interpreted.' As such, the gap does not actually exist as an overt entity in the input signal received by the hearer. The gap is, technically, an absence. In actual fact, we assume that the parser decides where the gap was after reading *past* it. For example, consider:

(2)

a. Who did Max say t_i saw Ernie?
b. Who did Max say Ernie saw t_i yesterday?
c. Who did Max say Ernie saw t_i?

In (a), the parser would realize at *saw* that the subject is missing. In (b) it would realize at *yesterday* that the object is missing. In (c) it would realize at the end of the input that the object is missing.
While the gap is technically an absence, it turns out that for the purposes of stating our theory here, it is easiest to speak of and draw the gap as an overt object. So, on the tree, we will draw the gap as a terminal node. For example, in (3), the gap, drawn as t_i, is a child to S1, which is of type S.



(3)

In what follows, each non-terminal node has a *name* and a *type*. The type is the kind of phrasal category that that node is an instantiation of (i.e. either S, NP, PP or AP). The name is used to label and identify the node. For example, in (3), we see a node of type S whose name (and label) is S_0. Though we will not develop formal conventions, the type should be clear from the label even if not explicitly stated. Further, in some cases, the node's name will also be its type (e.g. a node of type NP might be called NP), a slight abuse of notation from which no confusion should result.

One complication is required, however. We will require that each phrase contain more than one overt element, and the gap, t_i, is not an overt element. So, any phrase of the form XP = $[_{XP}$ X $t_i]$[3] must be *collapsed*—i.e. the non-terminal node XP is deleted and the children of XP become children to XP's mother. (To be precise, if YP = $[_{YP}$ A $[_{XP}$ X t_i] B] then, when XP is collapsed, we will have YP = $[_{YP}$ A X t_i B].)

So, consider, for example:

(4) $[_S$ Who$_i$ did John go home $[_{PP}$ with t_i]] → $[_S$ Who$_i$ did John go home with t_i]

The symbol → will always indicate that the collapse operation has occurred. Here, the PP is deleted and its children become children to the S. From now on, we will use square brackets to indicate constituent structure rather than drawing trees.

[3] In English, it happens that the phrase $[_{XP}$ t_i X] never occurs.

We are now ready to state the constraints that will derive (a more accurate variant of) the RH constraints, as well as predict the existence of other unacceptable wh-question forms.

(5) **Sentential Recursion Constraint (SRC)**:
   a. All of the gap's mother's ancestors must be of type S
   b. Every S that is an argument has no non-children to its right

From now on I will refer to (5)a as SRC1 and (5)b as SRC2. By non-children we mean ancestors and siblings. By M being "to the right of N" it is meant that M is a right-more sibling of N or else is the right-more sibling of an ancestor of N.

The mechanics of the SRC may be unclear to the reader at this point but the matter will be clarified as we apply the SRC to examples.

Let us start by considering a CNPC violation:

(6) * [$_S$ What$_i$ did John believe [$_{NP}$ the fact [$_{S1}$ that Bill wanted t_i]]]

Here, the gap's mother is S1. But, S1's mother is NP, which is of type NP. Thus, S1 has an ancestor which is not of type S. Thus, it is not the case that the gap's mother's ancestors are of type S. Thus, (6) is an SRC1 violation. All CNPC violations are derived similarly.

Consider next the A(djunct)IC violation:

(7) * [$_S$ What$_i$ did George order [$_{NP}$ the attack] [$_{PP}$ after [$_{S1}$ Saddam took t_i]]]

Here, again, the gap's mother is S1, which has a PP ancestor. PP is not of type S, so (7) is barred by SRC1. Note, however, that our account differs slightly in its predictions compared to the blunter Adjunct Condition of Huang because, under the SRC, the following sentences are allowed:

(8)
   a. [$_S$ Who$_i$ did George go home [$_{PP}$ with t_i]] → [$_S$ Who$_i$ did George go home with t_i]
   b. [$_S$ Where$_i$ did you do that [$_{PP}$ from t_i]] → [$_S$ Where$_i$ did you do that from t_i]

Gaps are allowed here because, in each case, the PP is degenerate and so collapsed. Thus, the gap's mother is the matrix S. The matrix S has no ancestors and so it trivially satisfies the condition that all of its ancestors are of type S. (Note that, even if each PP were not collapsed, the examples of (8) would still not constitute a SRC1 violation since each of each PP's ancestors would be of type S.)

My informants unanimously accept (8). Thus, we have an interesting empirical discrepancy between the predictions of the SRC one the one hand and those of Huang's (descriptive) Adjunct Condition and those theories that sought to explain it on the other. Both Huang 1982 and Chomsky 1986 attributed the prohibition on extraction of a wh-word from an adjunct to the fact that wh-words could not be extracted out of domains that were not 'governed[4]' in appropriate ways.

But, examples such as (8) suggest that the approach of barring extraction from an adjunct due to the nature of the position in which adjuncts find themselves is too coarse and makes incorrect predictions.

Also, note that a word which introduces a subordinate sentence that is not subcategorized by a verb—e.g., *since*, *because*, *if*—is treated as a preposition here, correctly predicting the deviance of sentences such as:

(9)
   a. ? [$_S$ What$_i$ does Mark eat fish [$_{PP}$ if [$_{S1}$ Ernie does t_i]]]
   b. ? [$_S$ What$_i$ does Mark eat fish [$_{PP}$ [$_{S1}$ because Ernie does t_i]]]

Before leaving the topic of PPs, let us note that one *can* find examples of questions with structures identical to those in (8) that are deviant, such as:

[4] 'Government' was a notion in vogue for a period after Chomsky 1981. Argument positions aside from the subject were typically governed while adjuncts were not.

(10) ? [$_S$ What$_i$ did you come home [$_{PP}$ after t_i]] →
? [$_S$ What$_i$ did you come home after t_i]

It seems, however, that this deviance is a pragmatic issue. The sentence involves more presupposition than its acceptable counterpart *When did you come home?* (i.e., because (10) presupposes the answerer came home *after* something). Kleunder (1992) and Hawkins (1999, see pp. 271—273) argue that, roughly, for question sentences in general, questions with 'too many' entailments are unacceptable. This is the same phenomenon illustrated in the distinction in acceptability in (11) and (12):

(11)
a. Who did Max see *a* picture of?
b. ? Who did Max see *the* picture of?

(12)
a. How angry did Max *say* that John was?
b. ?How angry did Max *whisper* than John was?[5]

The word *the* adds a presupposition of uniqueness in addition the presupposition of existentiality. More precisely, the relevant principle may phrased thus: if sentence S is acceptable and the entailments of T are a strict subset of those in S, then T is also acceptable; if S is unacceptable and the entailments of T are a superset of the entailments of S, then T is also unacceptable.

Some might argue that the deviance of (11)b is a result of hidden syntactic structure. However, since there is clearly a correlation between acceptability and number of (semantic or pragmatic) entailments, the use of hidden structure, especially if the presence of the hidden structure in turn correlates with the number of entailments, seems superfluous, unless one's theory is necessarily committed to it.

A final prediction made by the SRC1 is that a gap cannot be found inside an S dominated by an AP, resulting in what we might call an *Adjective Island Constraint*, a phenomenon which has apparently gone unnoticed so far:

(13)
a. *[$_S$ What is Max [$_{AP}$ upset [$_S$ that Ernie took t_i]]]
b. *[$_S$ How is Max [$_{AP}$ upset [$_S$ that Ernie took the cake t_i]]]

Turning to the Sentential Subject Constraint, consider:

(14) [$_S$ What$_i$ is [$_{S1}$ that Ernie will eat t_i] likely]

This is simply an SRC2 violation as S1 is an argument of type S that has material to its right. SSC violations are derived this way in general.

However, the SRC2 also predicts other types of unacceptability (i.e. it is a more general principle than the Sentential Subject Constraint):

(15)
a. ? [$_S$ Who$_i$ does [$_{S1}$ that Ernie will eat cake] bother t_i]
b. ? [$_S$ Who$_i$ did Mark say [$_{S1}$ Ernie was dating t_i] to Mary]
c. ? [$_S$ Who$_i$ did Mark say [$_{S1}$ Ernie was dating Carl] to t_i]

In each case, S1 has material to its right and so violates SRC2.

At this point, we should stop to verify that certain acceptable phrases can still be formed without violating the SRC. The reader should be able to verify at this point that the examples in (16) are each predicted to be acceptable.

(16)

[5] This example is from Hawkins (1999), which is in turn adapted from Cullicover and Wilkins (1984).

a. [$_S$ What$_i$ did Max say [$_S$ Dave wanted t_i]]
b. [$_S$ Who$_i$ did Max say [$_S$ t_i wanted Dave]]
c. [$_S$ Who$_i$ did Max say [$_S$ Dave gave a gift [$_{PP}$ to t_i]]] → [$_S$ Who$_i$ did Max say [$_S$ Dave gave a gift to t_i]]

Next consider sentences with infinitival constituents:

(17)
a. What did Max say he wanted to eat?
b. What did Max persuade Ernie to eat?
c. Who did Max say he wanted to go to the party with?

Supposing we analyze infinitivals as being of type S, we get the correct predictions. The following would then be the parses of (17), showing no SRC violations:

(18)
a. [$_S$ What$_i$ did Max say [$_S$ he wanted [$_S$ to eat t_i]]]
b. [$_S$ What$_i$ did Max persuade Ernie [$_S$ to eat t_i]]
(19) [$_S$ Who$_i$ did Max say [$_S$ he wanted [$_S$ to go to the party [$_{PP}$ with t_i]]]] → [$_S$ Who$_i$ did Max say [$_S$ he wanted [$_S$ to go to the party with t_i]]]

Finally, we consider the possibility of a gap occurring inside 'pictures of' NP context—i.e. an NP that contains what we might analyze as PPs but no S. Consider (20):

(20)
a. [$_S$ What$_i$ does Max like [$_{NP}$ pictures [$_{PP}$ of t_i]] → [$_S$ What$_i$ does Max like [$_{NP}$ pictures of t_i]]
b. [$_S$ What$_i$ does Max like [$_{NP}$ stories [$_{PP}$ about t_i]] → [$_S$ What$_i$ does Max like [$_{NP}$ stories about t_i]]

After each PP is collapsed, the gap's mother becomes the NP, whose only ancestor is the matrix S, thus satisfying SRC1. This contrasts with the behavior of a complex noun phrase, in which the gap's mother is an S dominated by an NP, thus violating the SRC1. The reader may be noting that it was only in these 'pictures of' contexts that the rule of collapsing phrases of the form XP = [$_{XP}$ X t_i] has had any practical effect in the course of this paper.

3 Discussion

This theory predicting the RH constraints has several advantages over traditional approaches to the question, such as those along the lines of Chomsky 1986 and 2001.

First of all, this theory can be stated in terms of the *surface structure of a sentence alone*. There is no need to assume specific facts about the derivation. Not only does this make for a more parsimonious theory but it makes for a theory that does not rise and fall as particular beliefs about the nature of a sentence's derivation change, as has often happened since, e.g., 1986.

The theory given can be applied to an arbitrary theory of how sentences can be derived. One particularly attractive possibility is that the wh-word begins in its canonical position and is then moved to the front of the word in one go, without successive cyclic movement. For example, (21)a might become (21)b directly without the wh-word having to stop at any intermediate position:

(21)
a. [$_S$ Jon said [$_S$ Bill wanted what$_i$]]
b. [$_S$ What$_i$ did Jon say [$_S$ Bill wanted t_i]]

Ungrammatical sentences would be ruled out if they violate the SRC at surface structure rather than because of some offense during the derivation. Such a proposal is attractive because it involves fewer transformational operations than does a cyclic approach.

4 Conclusion

The Sentential Recursion Constraint and contains simple rules predicting a more accurate variant of the RH constraints. The SRC also predicts other attested behavior, suggesting that it is indeed a generalization compared to the RH constraints as those are stated.

The SRC-based theory is argued to be more attractive than those which necessarily appeal to peculiar facts about the derivation because, assuming nothing about the nature of the derivation, it does not depend on theories which are in vogue staying vogue, and it can be applied to derivational theories from different theory families.

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The Reflexive Morphology of 1st-, 2nd-, and 3rd-Person Romance Middles

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1 Introduction

In this paper I develop an analysis of the reflexive morphology in Romance middles like the ones below, from which the referential and phi-feature properties of the reflexive follow. To my knowledge no analysis of Romance middles has sought to derive these properties. The morphology under consideration is exemplified by the *se*/*si* found in the French (1), Spanish (2), and Italian (3) examples below. Throughout the paper, I will refer to this morphology as the *weak reflexive*, and will gloss it as *REFL* although it will be shown to be syntactically distinct from other reflexive morphology.

(1) Le livre se lit bien
The book REFL.3 reads well
"The book reads well"

(2) El libro se lee bien
The book REFL.3 reads well
"The book reads well"

(3) Il libro si legge bueno
The book REFL.3 reads well
"The book reads well"

The analysis provides a characterization of the weak reflexive of Romance middles in terms of the typology entailed by the analysis of argument expressions developed in Fiengo & May (1994). In section 2 I develop a characterization of the referential and phi-feature properties of the weak reflexive in Romance middles. In section 3 I demonstrate that middles are structurally distinct from other string-identical 'constructions'. In section 4 I cover the background regarding argument expressions relevant to the cases considered here and develop an analysis of the weak reflexive of Romance middles that predicts its various properties. Section 5 concludes.

2 Referential and phi-feature properties of the weak reflexive

2.1 Referential properties

I follow without argument the idea (Roberts (1987), Ackema & Schoorlemmer (1995) and Lekakou (2005), among many others) that the external argument of the middle voice verb is not instantiated in syntax. Thus, the weak reflexive under consideration here cannot be an instantiation of the external argument. There is but a single referring DP argument in these sentences. I also advocate a slightly unusual position, namely the position that the verbs that form middles are inherently two-place predicates and must express their two-place nature in syntax, even in cases in which there is only one argument expression available to express this two-place nature. Middles are such cases: there is a single referring DP argument available to do the syntactic work normally allocated to two distinct referring DP arguments.

With this much in place, still left to determine is the position from which the single DP argument of middle voice verbs is associated with or expresses reference. I will take an extension of Quine's proposal that "to be is to be the value of a variable" to be sufficient in determining the syntactic position associated with reference for a given argument expression: the positions relevant to reference are the positions in which bound variables may appear. These will be called here R-positions. These positions correlate with

structural Case positions. Following the standard line that any given argument expression can bear no more than one structural Case entails that any given argument expression will be associated with no more than one R-position. I illustrate with a Spanish example. Because of the quantificational properties of the syntactic subject in (4), a bound variable will appear in the syntactic subject position, diagnosing it as the R-position, as illustrated in (5).

(4) Ningunos libros escritos en el estilo gótico se leyeron bien
No books written in the style Gothic REFL.3 read well
"No books written in the Gothic style read well"

(5) [Ningunos libros escritos en el estilo gótico]$_i$ t_i se leyeron bien

Wh-questions can be also be used to diagnose the syntactic position tied to reference. These questions always can be responded to with the value for the item that the middle predicate applies to, i.e., the logical object. I illustrate with an Italian example (6), which shows (given standard assumptions regarding chains, represented in the analysis in (7)) that the syntactic subject position is the structural Case position.

(6) Quale si legge bueno?
Which REFL.3 reads well?
"What reads well?"

(7) [Quale]$_i$ t_i si legge bueno?

Romance middle voice *wh*-questions always include a trace position (the structural Case and R-position) and the weak reflexive. Just as the *wh*-expression does not appear in an R-position or structural Case position, neither does the weak reflexive.

This subsection has shown that the weak reflexive of Romance middles does not introduce a referent and does not appear in a position from which an argument expression can be marked with structural Case or express reference. A successful analysis will predict these properties.

2.2 Agreement properties of the weak reflexive

The weak reflexive in Romance middles agrees with the syntactic subject. Most analyses of middles consider only third-person middles, like the examples (1), (2), and (3) from the introduction. The weak reflexive cannot disagree with the syntactic subject. I illustrate with a French example.

(8) Le livre se/*te/*me lit bien
The book REFL.3/REFL.2/REFL.1 reads well
"The book reads well"

Considering first- and second-person middles shows both that there is no person restriction on the syntactic subject of middles and further illustrates that the weak reflexive and syntactic subject must agree. The most natural cases are those in which the expression in syntactic subject position denotes an entity that is, in the normal case, animate. Verbs like *bribe* are useful here as no special circumstances are required to make a non-third person middle felicitous. I illustrate with a Spanish example.

(9) Los lingüistas se sobornan fácilmente, así (yo) me soborno fácilmente
The.PL linguists REFL.3 bribe easily, thus (I) REFL.1 bribe easily
"Linguists bribe easily, thus I bribe easily"

To get a wider range of verbs to allow non-third-person middles requires developing contexts in which normally inanimate objects would be treated as animate. In a play in which all of the characters are books, an argument over which books read well and which ones do not might include the following exchange. I use French to illustrate.

(10) Je me lis bien (spoken by *The Brothers Karamazov*)
I REFL.1 read well
"I read well"

(11) Non, tu ne te lis pas bien! (spoken in response by *War and Peace*)
No, you NEG REFL.2 read NEG well
"No, you don't read well!"

Given the unusual circumstances of the play, the verb *read* allows first- and second-person middles, and the weak reflexive must agree with the syntactic subject. The examples above show that although third-person middles may be far more common than first- and second-person middles, this is not due to a grammatical restriction.

2.3 Summary of properties of the weak reflexive

In this section I have shown that the weak reflexive of middle voice sentences must agree with the syntactic subject, whether the subject is first-, second-, or third-person, that the weak reflexive does not introduce a referent into the semantic interpretation of middle voice sentences, and that the weak reflexive is not in a structural Case/R-position.

3 Middles are structurally distinct from other string identical 'constructions'

3.1 Middles and ellipsis

In this section I show that although middles can be string-identical with a variety of other 'constructions' they are nevertheless to be analyzed as syntactically distinct from these 'constructions.' Here I consider unaccusatives and regular transitives with cliticized direct objects. I rely on the notion that ellipsis is licensed under syntactic identity, not semantic identity, though the data presented here do not provide new arguments for this position.

3.2 Middles and unaccusatives

There is a set of verbs that can appear both as unaccusatives and as middles. For example, the Spanish sentence below is ambiguous and allows a middle or unaccusative interpretation.

(12) El barco se hundió fácilmente
The boat REFL.3 sink.PST easily
"The boat sank easily"

But in a VP-ellipsis context, the interpretation of the verb must be middle across the board or unaccusative across the board, which (13) illustrates.

(13) El barco se hundió fácilmente y la canoa también
The boat REFL.3 sink.PST easily and the canoe also
"The boat sank easily and the canoe did too"

This example must be interpreted as unaccusative in both the matrix and elided subordinate clauses (with the meaning that there was a sinking of the boat and a sinking of the canoe, and that both sinkings were easy) or as middle in both the matrix and elided subordinate clauses (with the meaning that in the past, the boat was easy to sink and the canoe was easy to sink, regardless of the existence or non-existence of any sinking events). An interpretation in which the matrix clause is interpreted as middle and the elided subordinate clause is interpreted as unaccusative is not allowed, and neither is the reverse case allowed. The requirement on interpretation enforced by ellipsis shows that middles and unaccusatives are structurally distinct, although they may be string-identical.

3.3 Middles and regular reflexives

A subset of verbs that normally appear as transitives, with two referring argument DPs, can appear as middles. I will appeal to the context of the play described above, in which books are animate beings, in discussing the examples in this subsection. The Spanish sentence below is ambiguous and allows a middle or regular transitive interpretation. On the middle interpretation, the book asserts that it was a good read (perhaps it was well-written); on the regular transitive reflexive interpretation the book asserts that it did a good job of reading its own pages (perhaps another book in the play did not do so well).

(14) (Yo) me leí bien
(I) REFL.1 read.PST well
"I read well" or "I read myself well"

But in a VP-ellipsis context, the interpretation of the verb must be middle across the board or transitive reflexive across the board, which (15) illustrates.

(15) El articulo se lee bien y el cuento también
The article REFL.3 reads well and the story also
"The article reads well and the story does too"

This example must be interpreted as transitive reflexive in both the matrix and elided subordinate clauses (with the meaning that the article reads its own self well and the story also reads its own self well) or as middle in both the matrix and elided subordinate clauses (with the meaning that both the article and the story are good or easy reads). An interpretation in which the matrix clause is interpreted as middle and the elided subordinate clause is interpreted as transitive reflexive is not allowed, and neither is the reverse case allowed. The requirement on interpretation enforced by ellipsis here shows that middles and transitive reflexives are structurally distinct, although they may be string-identical.

3.4 Summary of findings due to ellipsis

In this section I have shown through ellipsis data that two 'constructions' that can be string-identical to middles are structurally distinct. In the analysis offered in section 4.2 I will concentrate on the transitive reflexive cases, as the verbs that form good middles are a subset of the verbs that normally appear as transitives. The focus will ultimately be on characterizing the weak reflexive in the two cases in a way that provides a syntactically distinct analysis of the two VP types.

4 Typology of argument expressions and application to Romance weak reflexive

4.1 Indexical values and indexical types: background

The account I advance in this paper develops the proposal of Fiengo & May (1994), an account of the nature and distribution of argument expressions in which indices are specified for both indexical value (familiar to most anyone who has studied Binding Theory in a Government and Binding/Principles and Parameters framework) and indexical type. Indexical type indicates whether a given expression is *independent* or *dependent*. Expressions that bear an α-index are independent; expressions that bear a β-index are dependent.

To give a brief illustration, in the sentence *John kicked himself*, *John* c-commands and bind *himself*. *John* and *himself* share the same indexical value; the two expressions are coindexed as in standard GB/P&P theory. But their indexical types are different. *John* bears an α-index, as the expression *John* is not dependent on any other. *Himself* bears a β-index, as the expression *himself* is dependent on another expression, namely the expression *John*. Although *himself* is dependent on *John*, both expressions introduce a referent into the semantic representation. That the referent of *himself* is identical to the referent of *John* is given by grammatical principles.

The analysis developed in Fiengo & May (1994) is much more nuanced and complete than the brief description above can capture. The notion of independent and dependent expressions, and the question of

whether an expression introduces a referent or does not should suffice in developing the analysis presented in 4.2.

4.2 Analysis of middle weak reflexive

In developing an account of the weak reflexive of Romance middles, I concentrate on making a syntactic distinction between the (cliticized) transitive reflexive VP and the middle VP discussed in section 3.3, as the verbs that form good middles are a subset of the transitive verbs. The question is: what distinguishes the VP of (16) from the VP of (17)? Although the two are string-identical, the discussion of ellipsis in 3.3 shows that the two are structurally distinct.

(16) El articulo se lee bien
The article REFL.3 reads well
"The article reads its own self well" (transitive reflexive)

(17) El articulo se lee bien
The article REFL.3 reads well
"The article reads well" (middle)

Example (16) expresses that there is an object that the article reads well. It may be strange that an article would read anything, but given the context of the play established above, it might be possible that an article would read any number of things in print, including plays, poems, and articles. What (16) expresses is that the thing that the article reads well is in fact its own self. Example (17) expresses that the article is a good, easy, or otherwise positively characterized read.

One possibility to consider in providing a structurally distinct account of the VPs of (16) and (17) is that the verb *leer*/*read* is different in the two cases, that is, that the grammar recognizes transitive *leer* and middle *leer* as syntactically distinct objects. I will reject this hypothesis on the view that it introduces unprincipled redundancy into the grammar.

The second possibility to consider is that the *se* of (16) and the *se* of (17) are not syntactically identical. Characterizing the *se* of (16) is simpler than characterizing the se of (17), and so I start there. The relationship between the expression *el articulo* and the expression *se* is the same as the relationship between the expression *John* and the expression *himself* described in 4.1. Here, *el articulo* and *se* bear the same indexical type, but while the expression *el articulo* is independent and thus bears an α-index, the expression *se* is dependent and thus bears a β-index. Grammatical principles require that the two expressions refer to the same item. (16) is thus represented as in (18).

(18) $[\text{El articulo}]_{i,\alpha}$ $\text{se}_{i,\beta}$ lee bien

Now the question is how the expression *se* of (17) might be characterized differently. An expression that bears a β-index will introduce a referent and will be dependent on another expression in the syntactic structure. As discussed above, the weak reflexive of middle voice sentences does not introduce a referent into the semantic representation. Thus, the indexical type of *se* in (17) cannot be β.

Another consideration argues further that the indexical type of *se* in (17) cannot be β. As noted in section 2.1, I view middles as inherently two-place predicates that must express their two-place nature in syntax. Thus, in middles only a single referring DP argument is available to do the syntactic work normally allocated to two distinct referring DP arguments. Viewing *el articulo* and *se*, then, as a discontinuous instantiation of the middle's single argument, it cannot be that they bear distinct indexical types. This argues in favor of analyzing (17) as in (19).

(19) $[\text{El articulo}]_{i,\alpha}$ $\text{se}_{i,\alpha}$ lee bien

This analysis, in which the weak reflexive of Romance middle voice sentences is an alpha type reflexive predicts that it will agree in phi features with the syntactic subject, as it is of the same syntactic type. Although expressions that bear an α-index are independent and introduce a referent, the expression *se* of (17) bears an α-index in virtue of its being part of the expression *el articulo*.

A final possibility to consider is that the expression *se* in (17) bears an indexical value but does not bear an indexical type. This would amount to characterizing *se* as syntactically the same as an NP-trace. Because nothing presented here argues forcefully against this characterization, I allow it as a possibility, and illustrate it in (20).

(20) [El articulo]$_{i,\alpha}$ se$_i$ lee bien

The analyses of the middle presented in (19) and (20) provide a formal characterization of the non-identity between the middle VP and the transitive reflexive VP.

5 Conclusion

In this paper I have argued that the weak reflexive in Romance middles is a non-referential reflexive. Analyzing this morpheme as an alpha-type or untyped (but importantly, not a beta-type) morpheme that is part of the single argument expression DP in middle voice sentences predicts the agreement and referential properties described here: the reflexive agrees with the syntactic subject, no matter the person, and it does not introduce a referent. A non-beta typed reflexive is expected to appear in grammar, given the typology of argument expressions entailed by the account in Fiengo & May (1994). The account has the advantages of predicting the weak reflexive's properties, something I have not seen in other analyses of the Romance middle.

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Place Markedness and Dorsal Defaults: Snapshots of the Acquisition of Phonological Features

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1 Introduction

Well known in phonological theory is the markedness scale for place of articulation features, in which dorsal is thought to be a more marked feature than labial, which in turn is thought to be more marked than coronal. This markedness scale is schematized in (1).

(1) *Dorsal > *Labial > *Coronal.

Current research often assumes that the hierarchy in (1) is universal, context free, and inviolable (deLacy 2002; Prince and Smolensky 1993). However evidence from first language acquisition (as well as other sources) does not uniformly support the universality of ranking. For example, Hume (2003) argues that the hierarchy is not universal, but rather can and should be determined on a language by language basis. Specifically looking at language acquisition, Ullrich et al (2007) provide a case study of a child whose grammar supports a dorsal default.

In this paper, I contribute to the list of exceptions to the hierarchy in (1) with a case study of Anna (age 2;1-2;3). At age 2;1, Anna's grammar is characterized by an across the board neutralization of place features in word initial onsets. At age 2;3 the realization of place features in word initial onsets is more variable, but importantly, all place errors involve substituting coronal or labial features for dorsal ones. This apparent default to dorsal pattern runs counter to the standard markedness hierarchy, and calls into question its universality.

This paper will proceed as follows. In §2, I discuss methodological issues related to data collection, and in §3, I provide an overview of place neutralization in Anna's grammar at age 2;1. In §4, I provide an analysis of the 2;1 data that builds on the notion of featural complexity. In §5, I outline the predictions that the strict markedness hierarchy hypothesis make for further phonological development, and in §6, I present data from a later stage in Anna's development which runs counter to the predictions in §5. In §7, I present an analysis of the data that builds on the proposal the markedness hierarchy to be context dependent, and in §8 is the conclusion.

2 Methodology

As mentioned, the subject for this study was Anna, a normally developing child of monolingual English parents. At the time of the study, Anna was 2;1-2;3, and resided in Vancouver, B.C. She was born in Calgary, Alberta.

Data collection involved taking a series of video recordings in October and December 2007. The recordings were of spontaneous and/or "guided" parent-child and/or sibling-sibling interactions. So called "guided" interactions involved the other participant (either the father or older sister) directing Anna's attention to certain objects in order to elicit particular targets.

The recordings were taken with a Panasonic AGDVC30 video camera. Both participants were equipped with Countryman EMW cordless lapel microphones and Sennheiser EW112PG@ lapel wireless transmitters.

3 Anna, Age 2;1: Place Neutralization

At 2;1, Anna's grammar is characterized by place neutralization, in which all word initial voiceless onsets are realized as [h-]. The data in (2) exemplifies neutralization of place features in simplex onsets, and that in (3) exemplifies neutralization in complex onsets.

(2) a. p, t, k → h / #_
[hi:pi] 'peepee'
[hi:taj] 'teeth-time'
[hændi] 'candy'

b. ʧ → h / #_
[hɛ] 'chair'

c. f, θ, s, ʃ → h / #_
[hʌni] 'funny'
[hʌm] 'thumb'
[hɛpɛ̃] 'seven'
[huz] 'shoes'

(3) a. pɹ, pl, tɹ, kɹ, kl → h / #_
[hi:ku] 'preschool'
[hejgawn] 'playground'
[hʌk] 'truck'
[hej] 'crayon'
[hɑbət] 'closet'

b. fɹ, fl, θɹ, sl, sw → h / # _
[hajz] 'fries'
[hut] 'flute'
[hi:] 'three'
[hi:pi] 'sleepy'
[hɪŋ] 'swing'

c. sp, st, sk → h / # _
[hɑ] 'spot'
[hɪkə] 'sticker'
[hu:] 'school'

d. stɹ, skɹ → h / #_[1]
[hit] 'street'
[hæbow] 'scrambled'

As observed in (2) and (3), place neutralization in word initial voiceless onsets is across the board, affecting stops, affricatives, fricatives, and combinations of these. Interestingly, place neutralization is restricted exclusively to onsets that are word initial. For example, a target input such as 'peepee' is realized as [hi:pi], not [hi:hi].

In contrast with the across the board neutralization of place features in word initial voiceless onsets is the pattern observed with word initial voiced onsets. As exemplified in (4) and (5), place features in voiced onsets are faithfully realized.

[1] Not all adult targets are attested at all periods.

(4) a. b, d, g

[bun]	'balloon'
[dajpə]	'diaper'
[gəgə]	'good girl'

b. ð, z

[dɛ]	'there'
[zibə]	'zebra'

c. m, n

[mʌmi]	'mommy'
[now]	'nose'

d. l, r

[yæm]	'lamb'
[wajdɛ]	'right there'

(5) br, bl, dr, gr

[bowkən]	'broken'
[bæk]	'black'
[dɑ]	'draw'
[gawn]	'ground'

The data in (4) and (5) demonstrate that place features in voiced onsets are faithfully realized. Other processes (such as stopping in 4b, gliding in 4d, and cluster reduction in 5) are observed, but none of these affect the place feature represented by the onset segment.

Unlike some other phonological processes in acquisition, place neutralization in Anna's grammar does not trigger a chain shift. Word initial /h-/ is realized faithfully as [h-], as shown in (6).

(6) h → h / #_

[howti]	'horsie'
[haws]	'house'
[hɛyo]	'hello'

In sum, in Anna's 2;1 grammar, place neutralization occurs in only and all word initial onsets that contain at least one voiceless segment.

4 The [+SG] / Place Connection

Why is place neutralization in Anna's 2;1 grammar restricted to word initial onsets? I propose that the key factor is aspiration. In English, voiceless but not voiced onsets are aspirated[2], and aspiration is most salient word initially. How aspiration affects the realization of place features can be understood in terms of featural complexity. Let's assume that aspirated segments bear the feature [+Spread Glottis] (or [+SG]), and unaspirated segments are unmarked with respect to this feature. It seems that, in Anna's 2;1 grammar, segments bearing both [+SG] and a place feature are too complex. [+SG] segments without a place feature are realized as [h].

[2] Indeed, it is claimed that [±SG] is the relevant feature for voiced versus voiceless consonants in English, rather than [±voice] (Kager et al 2008)

4.1 An OT Analysis

In this section, I present a formal account of the featural complexity hypothesis, framed in an Optimality Theoretic framework. The acquisition model that I assume is one in which in early grammars, markedness constraints generally outrank faithfulness constraints (Gnanadesikan 2004). As acquisition proceeds, markedness constraints are demoted[3], allowing for more faithful outputs to be realized.

In order to account for the pattern of place neutralization in Anna's 2;1 grammar, three constraints are required, as defined[4] in (7)-(9) below.

(7) MAX-IO(PLACE)
"Place features in the input have correspondent Place features in the output"

(8) MAX-IO(LAR)
"Laryngeal features in the input have correspondent laryngeal features in the output"

(9) *{+SG + PLACE}
"A single segment does not bear both [+SG] and Place features in the output"

In Anna's 2;1 grammar, these constraints are ranked as in (10).

(10) MAX-IO(LAR) >> *{+SG + Place} >> MAX-IO(PLACE)

Importantly, because all three place features are neutralized, the place markedness hierarchy is not actively invoked in this ranking. This ranking correctly predicts that place features in voiceless onsets will be neutralized, and those in voiced onsets will be faithfully realized. This is depicted in the two tableaux below.

(11) Tableau for 'key'

/k^{h}i/	MAX-IO (LAR)	*{+SG + Place}	MAX-IO (PLACE)
[ki]	*!		
[gi]	*!		
[k^{h}i]		*!	
☞[hi]			*

(12) Tableau for 'go'

/gow/	MAX-IO (LAR)	*{+SG + Place}	MAX-IO (PLACE)
[kow]	*!		
☞ [gow]			
[k^{h}ow]		*!	
[how]			*!

As observed in (11) and (12), the ranking in (10) correctly predicts that the output for a voiceless onset, as in 'key,' will be [h-], and the output for a voiced onset, as in 'go,' will be faithfully realized.

Other suboptimal outputs, such as those with onsetless syllables or consonant clusters, can be accounted for by assuming that additional high ranking markedness constraints (such as ONSET or *CC) are also at work. Aside from these more specific cases, however, the basic generalization that word initial voiceless onsets are realized as [h] can be captured with reference to three main constraints.

[3] Or perhaps, faithfulness constraints are promoted. For purposes of this paper, I abstract away from the question of constraint promotion versus demotion, but see Stemberger and Bernhardt (2001) for discussion.
[4] Constraint definitions are adapted from Kager (1999).

5 What's Next? Predictions

In Anna's 2;1 grammar, all word initial voiceless onsets are neutralized to [h], regardless of their target place features. As such, there is no empirical evidence for a place hierarchy during this period of her development. However, the strong universalist hypothesis (deLacy 2002) assumes that, despite a lack of evidence, the hierarchy is present and inviolable in Anna's 2;1 grammar. Further, this hypothesis implicitly assumes that the ranking does not vary depending on context. As such, the markedness constraint referenced in §4, *{+SG + Place} could indeed be considered an umbrella term for a hierarchy of constraints, as in (13).

(13) *{[+SG] + Dorsal} >> *{[+SG] + Labial} >> *{[+SG] + Coronal}

If we assume that the place hierarchy is universal, then constraint demotion should obey the hierarchy. Under this assumption, demotion can proceed in various ways, but crucially, the universal ranking is always maintained. For example, the constraint *{[+SG] + Dorsal} is predicted to never rank below *{[+SG] + Labial} or *{[+SG] + Coronal}. Empirically, the prediction is that, as Anna's phonology develops, she will permit segments with both [+SG] and Place features for coronal before labial before dorsal targets. However, as seen in the following section, this prediction is not borne out.

6 Anna, Age 2;3: Variable Place Features

In Anna's grammar at age 2;1, place neutralization occurs across the board; all word initial voiceless onsets are realized as [h-]. Two months later, at age 2;3, place features are more variably realized. In particular, three patterns can be observed for the production of target word initial voiceless onsets, (i) they are realized persistently as [h-], (ii) they are realized faithfully, or (iii) they are realized as dorsal [k^h-]. These alternatives are not mutually exclusive; the same target onset, and indeed the same target word, may have variable realizations at different times.

Consider first the now familiar pattern of place neutralization, as exemplified in (14) below.

(14) Persistent place neutralization

a. Coronal targets realized as [h]

[howz]	'toes'
[hi:yo]	'cereal'
[hip]	'sheep'
[hɪŋ]	'swing'

a. Labial targets realized as [h]

[hap^{h}i]	'puppy'
[hajə]	'fire'
[hɛŋk^{h}u]	'thankyou'
[hɛzɛn]	'present'
[hut]	'fruit'
[hi]	'three'

c. Dorsal targets realized as [h]

[hændi]	'candy'
[hɑ]	'clock'
[hiyɪŋ]	'skiing'

In (14), coronal, labial, and dorsal targets are all realized as [h-]. In (15), a second pattern is observed, in which place features are faithfully realized.

(15) Faithfully realized place features

a. Coronal targets realized as [Coronal]

[tʰu]	‘two’
[tʰɪ]	‘six’
[ʦu:]	‘shoes’
[tʰiz]	‘cheese’
[tʰi:pʰɪn]	‘sleeping’
[tʰit]	‘street’

b. Labial targets realized as [Labial]

[pʰidə]	‘Peter’
[pʰaj]	‘five’
[pʰun]	‘spoon’
[pʰi] ~ [wi]	‘three’
[pʰiz]	‘please’

c Dorsal targets as [Dorsal]

[kʰɪt]	‘kiss’
[kʰi:nə]	‘clean up’
[kʰaj kʰejn]	‘sky train’

In (15), stops, fricatives, affricates, and clusters are all observed with faithful place features. Furthermore, like place neutralization in (14), faithful realization of place features is observed for coronal, labial, and dorsal targets. In contrast, place errors are asymmetric. Interestingly, during this period of acquisition, the only attested place of articulation errors are those in which a coronal or labial target is realized as dorsal. Consider the data in (16).

(16) Place Errors

a. Coronal targets realized as [Dorsal]

[kʰows]	‘toast’
[kʰej]	‘say’
[kʰowz]	‘shows’
[kʰa:kʰət]	‘chocolate’
[kʰaj]	‘try’
[kʰi:t]	‘street’
[kʰow]	‘snow’

b. Labial targets realized as [Dorsal]

[kʰɪyow]	‘pillow’
[kʰok]	‘fork’
[kʰɛjdow]	‘playdough’
[kʰajz]	‘fries’

In sum, although outputs are more variable during this period, what is most striking is that all errors in the realization of place features are those in which coronal or labial onsets are realized as dorsal. The following section provides a formal account of this pattern.

7 A Dorsal Default?

Given the pattern observed in §6, one might be tempted to ask whether Anna is somewhat unique in having a dorsal (rather than a standardly coronal) default. However, this is clearly not the case, precisely because Anna’s place of articulation errors are all context dependent, restricted to [+SG] contexts.

A more plausible explanation appeals to the notion of ease of articulation. Simply put, my proposal builds on the idea that [+SG] dorsal consonants are easier to produce than [+SG] labial and coronal consonants. The reason for this is that in order to produce aspiration, a build-up of pressure in the oral cavity is required before consonantal release, and because dorsal segments make use of a smaller cavity, it easier to build up pressure (Gamkrelidze 1975). Thus, with respect to ease of articulation of aspirated consonants, dorsal can be considered the *least* marked place feature. As such, I propose that the relevant markedness constraints can be ranked as follows:

(17) *{[+SG] + LAB} >> *{[+SG] + COR} >> *{[+SG] + DOR}

Furthermore, based on the data observed in §6, I propose that the phonetically grounded markedness relation can override the more general markedness hierarchy in this specific phonological environment.

7.1 An OT Analysis

It is reasonable to assume that in the course of phonological acquisition, demotion of a constraint is not something that takes place in one simple step. Rather, variable outputs for a single target can be taken to reflect variable constraint demotion. Specifically in regards to constraint demotion in Anna's grammar, the variability in Anna's 2;3 grammar can be accounted for by assuming that the set of *{[+SG] + Place} constraints are undergoing a process of demotion.

In order to account for the data in §6, an additional markedness constraint is required, as given in (18).

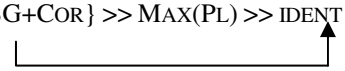
(18) IDENT-IO (PLACE)
"Correspondent segments have identical values for Place features"

I suggest that the *{[+SG] + Place} constraints are variably ranked with respect to MAX-IO(PLACE) and IDENT-IO(PLACE). Three different rankings account for the three different outputs observed. These are summarized in (19).

(19) Possible rankings

i. No *{[+SG] + Place} constraints are demoted
MAX(LAR) >> *{[+SG]+LAB} >> *{[+SG]+COR} >> *{[+SG]+DOR} >> MAX(PL) >> IDENT

ii. Only *SG+DOR is demoted
MAX(LAR) >> *{[+SG]+LAB >> *{[+SG+COR} >> MAX(PL) >> IDENT >> *{[+SG]+DOR}



iii. All **SG+Place* constraints are demoted
MAX(LAR) >> MAX(PL) >> IDENT >> *{[+SG]+LAB} >> *{[+SG]+COR} >> *{[+SG]+DOR}

The three rankings in (19) account for the three types of outputs in Anna's 2;3 grammar. Tableaux for each are given in (20)-(22) below.

(20) Tableaux for ranking (19i), no constraint demotion

/t^{h}owz/	MAX LAR	*+SG +LAB	*+SG +COR	*+SG + DOR	MAX PLACE	IDENT PLACE
☞ [howz]					*	
[t^{h}owz]			*!			
[k^{h}owz]				*!		*
[p^{h}owz]		*!				*
[towz]	*!					

/p^{h}iz/	MAX LAR	*+SG +LAB	*+SG +COR	*+SG + DOR	MAX PLACE	IDENT PLACE
☞ [hiwz]					*	
[p^{h}iz]		*!				
[k^{h}iz]				*!		*
[t^{h}iz]			*!			
[piz]	*!					
/k^{h}ændi/						
☞ [hændi]					*	
[k^{h}ændi]				*!		
[t^{h}ændi]			*!			*
[p^{h}ændi]		*!				
[kændi]	*!					

In (20), none of the *{[+SG] + Place} constraints are demoted, and voiceless onsets are realized as [h] for all target place features. This pattern is the same as that observed for Anna's 2;1 grammar.

In (21), however, only the lowest ranking markedness constraint, *{[+SG]+DOR}, is demoted, triggering place errors for coronal and labial targets.

(21) Tableaux for ranking (19ii), partial constraint demotion

/t^{h}owz/	MAX LAR	*+SG +LAB	*+SG +COR	MAX PLACE	IDENT PLACE	*+SG + DOR
[howz]				*!		
[t^{h}owz]			*!			
☞ [k^{h}owz]					*	*
[p^{h}owz]		*!			*	
[towz]	*!					
/p^{h}iz/						
[hiwz]				*!		
[p^{h}iz]		*!				
☞ [k^{h}iz]					*	*
[t^{h}iz]			*!		*	
[piz]	*!					
/k^{h}ændi/						
[hændi]				*!		
☞ [k^{h}ændi]						*
[t^{h}ændi]			*!		*	
[p^{h}ændi]		*!			*	
[kændi]	*!					

As seen in (21), dorsal onsets surface as optimal when the lowest ranking *{[+SG] + Place} constraint is demoted, but the higher ranking ones are not. In contrast, when all three constraints are demoted, place features are faithfully realized. This is shown in (22).

(22) Tableaux for ranking (19iii), total constraint demotion

/t^{h}owz/	MAX LAR	MAX PLACE	IDENT PLACE	*+SG +LAB	*+SG +COR	*+SG + DOR
[howz]		*!				
☞ [t^{h}owz]					*	
[k^{h}owz]			*!			*
[p^{h}owz]			*!	*		
[towz]	*!					

/p^{h}iz/	MAX LAR	MAX PLACE	IDENT PLACE	*+SG +LAB	*+SG +COR	*+SG + DOR
[hiwz]		*!				
☞ [p^{h}iz]				*		
[k^{h}iz]			*!			*
[t^{h}iz]			*!		*	
[piz]	*!					
/k^{h}ændi/						
[hændi]		*!				
☞ [k^{h}ændi]						*
[t^{h}ændi]			*!		*	
[p^{h}ændi]			*!	*		
[kændi]	*!					

In (22), faithfulness constraints outrank markedness constraints, and as a result, outputs are faithful to their input specifications.

In sum, under this analysis, the variability in Anna's outputs is the result of variable constraint demotion. The variability lies in where the *{[+SG] + Place} constraints are ranked with respect to place faithfulness constraints. Whether none of the constraints are demoted, only the lowest ranking *{+SG+DOR} is demoted, or all of the constraints are demoted, gives rise to the three different output patterns observed in Anna's 2;3 grammar.

8 Conclusion

To summarize, I have provided data from two snapshots of Anna's developing grammar, one at age 2;1 and a second at age 2;3. In the first period observed, word initial voiceless onsets are realized across the board as [h-], and in the second period, word initial onsets show more variability; some are persistently realized as [h-], others as dorsal [k^h], and still others with their faithful place specifications.

I observed that both place neutralization at 2;1 and place substitution at 2;3 are context dependent, occurring only when the feature [+SG] is active. Building on this observation, I argued for a context dependent markedness hierarchy reversal, in which the combination of features [+SG] and dorsal is the least marked combination, due to relative ease of articulation. This proposal supports a view in which the place markedness hierarchy is not inviolable, but can be overridden in specific phonological contexts

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Dong Bu Dong? – An Comprehension Check Question In CSL Classroom Discourse

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1 Introduction

Across disciplines, questions are so frequently used by teachers to realize their pedagogic goals in their daily teaching that it is surprising no research on teacher questions in second language classrooms had been done before early 1980s (Long & Sato, 1983). Subsequent to Long and Sato, teacher questions has become a hot topic studied by numerous researchers. However, the majority of these studies focuses either on the forms and functions of questions, or on particular questions types, such as referential and display questions. This study investigated the effect of an A-not-A comprehension check question *dong bu dong* (literally, "understand not understand?" meaning roughly "do you understand or not?") in Chinese as a second language (CSL) classroom discourse. The research investigated perspectives of the teacher, the students and the researcher. The research question of the present study is: how effective does *dong bu dong* function as a comprehension check question in the classroom discourse?

2 Background

2.1 Teacher questions in L2 classrooms

Teachers ask all kinds of questions in classroom discourse. These questions can be further subcategorized into four groups by using Kearsley (1976), taxonomy of question functions: expressive, social control, epistemic and echoic. Echoic questions refer to "those which ask for the repetition of an utterance or confirmation that an utterance has been interpreted as intended" (e.g., Pardon? What? Huh?) (1976: 360). There are three subtypes under echoic: a. comprehension checks, b. clarification requests, and c. confirmation checks, which are considered as questions in interaction since they have "the specific function of maintaining interaction by ensuring that the interlocutors share the same assumptions and identification of referents" (Chaudron, 1988: 130). Researchers have been interested in how echoic questions relate to L2 development in classroom interaction given that they promote more opportunities of negotiation between learners and the teacher (Ellis 1985; Pica & Long 1986). However, the majority of previous research focuses on quantity and types of questions asked by teachers (Long & Sato, 1983; Pica & Long, 1986; White & Lightbown, 1984), whereas limited research has been done on different types of questions and their relationship with quantity and quality of responses elicited from learners (Brock, 1986; Nunan, 1987; Wintergerst, 1993; Wu, 1998). In addiction, while certain types of questions drew most attention from previous researchers, for instance, referential and display questions (Banbrook & Skehan 1990; Nunn, 1999; Tollefson, 1988; Yang, 2006), limited research has been conducted on other types of questions, such as comprehension check question.

The current study investigates comprehension check questions, which is the most frequently observed echoic question type (Long & Sato, 1983; Pica & Long, 1986) and second most frequently observed question type (including both epistemic and echoic questions) in the ESL classroom (Long & Sato, 1983). It "elicits assurance from the listener that a message has been received correctly" or "presupposing a positive answer" (Chaudron, 1988: 130). It is typically formed in the following ways: a. tag questions, b. repeating the entire of part of the utterance spoken by the same speaker previously in a rising intonation, and c. by utterances like *Do you understand?* OK? Alright? (Long & Sato, 1983). The focus of this paper, however, is a Chinese A-not-A structure question *dong bu dong*.

2.2 A-not-A question dong bu dong in Chinese

There are four basic questions types in Chinese: question-word question, disjunctive question, tag question and particle question (Li & Thompson, 1981). A-not-A question is a subcategory under disjunctive question, which offers the addressee with two alternatives to either confirm or deny the proposition in the question. It is usually formed by a verb, an adjective, or an adverb. It is used in a neutral context "in which the questioner has no assumptions concerning the proposition that is being questioned and wished to know whether it is true" (1981: 550). Therefore in classroom discourse, *dong bu dong* is supposed to elicit either an affirmative response *dong* or a negative response *bu dong* from the students.

To the researcher's knowledge, no previous research has examined *dong bu dong* in Chinese classroom discourse, though researchers Chen and He (2001) investigated another A-not-A question, such as *dui bu dui* (in Chinese means "correct-not-correct." in English, roughly "right?"). They found that besides being used as an A-not-A question which conveys propositional meanings, *dui bu dui* can also be used as a non-A-not-A question which conveys pragmatic meanings. When *dui bu dui* is used as a non-A-not-A question, often, no response is received from the learners. A non-A-not-A question can function as either a basic marker when *dui bu dui* used at the end of TCU (Turn constructional units) to enforce the illocutionary force of the sentence proposition (Fraser 1990, 1996); or it can function as a discourse marker as a independent TCU to either mark boundaries and signal transitions at different interactional levels, or functions as a filler to help the teacher maintain learners' attention.

Compared with *dui bu dui, dong bu dong* is used less frequently in the classroom, especially in the classroom of higher education. In Chinese, *dong* means "to understand" which usually refers to "understand the reason or logic": for instance, *dong li mao* (be polite) or *dong dao li* (be reasonable, be logical). On the other hand, the negative form of *dong--budong* has a relatively negative semantic meaning as it suggests one does not have common sense and logic in certain area or on certain issues. Therefore *dong bu dong* implies "do you have common sense of …?", which sounds too direct to be polite in Chinese culture (Xun, 1993). Because of the rather aggressive illocutionary force of *dong bu dong*, it is less frequently used by teachers in higher levels of academic classroom discourse since the students are mostly adults rather than children. However, in this study, the data collected during the ethnographic interview showed that the majority of the learners participating in this study did not have the sense of the aggressive tone of *dong bu dong*, though quite number of them did feel it was more direct compared with the other frequently used A-not-A question *you mei you wen ti* "do you have a question or not".

2 Data collection and methodology

The data presented in this study were video recorded in October 2007. It consists of three 50-minute class meetings involving a female teacher who is bilingual in Chinese and English, and 35 undergraduate students from her two intermediate level Chinese classes (Class 1=C1, Class 2= C2) at University of Florida (C 1 = 16; C 2 = 19). The students' age ranged from 18 to 26 and their average length of study Chinese was six months. Learners of this proficiency level were chosen because they acquired considerable level of communicative and comprehensive skills in Chinese which enabled them to understand the teacher.

Prior the data collection, the researcher visited and observed the two classes for approximately one month. This observation served two purposes: 1) to obtain first hand information about these two classes (e.g. the teaching style of the teacher, the students, and classroom routines); 2) as the students became familiar with the researcher, they felt comfortable to speak out their thoughts during the ethnographic interview.

According to the observation, the teacher usually conducted the lesson in a manner combining communicative instruction and focus-on-form instruction. While most of the class activities were conducted within small groups, the teacher-fronted lecture style was only used when she tried to explain grammar points to the whole class. During group activities, two to five students formed a group to discuss and complete various tasks (e.g., reading questions, grammar exercises, and role plays). The teacher moved around and entertained questions from individual students.

The scenes which contain *dong bu dong* asked by the teacher were edited into two sets of video clips: Video A: teacher-fronted lecture (N=4; C1=3, C2=1); Video B: small group activity (N=4). Subsequently the teacher and 20 volunteers (M=5; F=15) from the students participated in ethnographic interviews. During the interview, the teacher was shown both Video A and B. All of the students were shown video

clips selected from Video A, while the four students who were recorded during small group activities were also shown the clips they were in.

Ethnographic interviewing was used in this research for its open-ended nature (Boxer, 1996), which allowed both the teacher and students to comment freely on the effect of *dong bu dong*.

3 Results and discussion

The 150-minute data consists of three Chinese lessons: L1 and L3 were conducted with C1, while L2 was taught in C2. In both L1 and L2 grammar points taught on the previous lesson were reviewed through two activities—sentence making and grammar teaching. During the first activity, two or three students formed a small group. They were required to make sentences by using requested grammar points. During the second activity, four or five students formed a group to discuss and prepare the grammar point assigned to their group for approximately 10 minutes. Then there were asked to teach the grammar point to the whole class with example sentences created during group discussion. When students were working in their groups, the teacher walked around responding questions. In between she explained certain common problems in grammar shared by the majority of the students in a teacher-fronted lecture style. L3 was a translation practice in which students were requested to translate approximately ten sentences from English to Chinese by using the grammar points covered in the textbook.

26 tokens of *dong bu dong* were found in the 150-minute data, which are categorized into two sets of data in terms of the nature of the activity: Data A. Teacher-fronted lecture (N=20); Data B. Small group activity (N=6). The distribution of *dong bu dong* is shown in Table 1.

Table 1 Distribution of dong bu dong.

Activity	**Tokens of *dong bu dong***	**Percentage (%)**
Teacher fronted	20	76
Small group	6	24

3.1 Data A: the teacher-fronted lecture

3.1.1 Data of video clips

20 tokens of *dong bu dong* were identified in the teacher-fronted lecture, which mainly appear in two contexts: a. after a long explanation of grammar points in Chinese; b. after a group activity instruction given in Chinese. These two situations are represented in sequence 1 and sequence 2 below.

Sequence 1.

001 T: 至于, as for, OK, 那两个菜好吃吗? 对吗? 因为我们知道有两个菜，有两个菜，对吗? 一个菜很好吃, 至于另外一道菜, 不好吃。 至于另外一道菜，太咸。
Zhi yu, as for, Ok, are those two dishes delicious? Right? Because we know there are two dishes. There are two dishes, right? One is very delicious, as for the other one, not delicious. As for the other dish, it is too salty.

002 S1: 老师, 可以说一个菜好吃, 一个菜不好吃?
Teacher, can I say one dish is delicious, one dish is not delicious?

003 T: 可以呀。
You can.

004 S1: 很简单。
It is very simple.

005 T: 但是语言, 那你小孩子可以这么说。 但是你长大了。 像我小的时候，我可以说 dada, mama, 但是现在呢, 我不这么称呼我爸爸、妈妈，对不对？语言就是这样子。至于呢也是一样。可以不用它。我跟朋友聊天的时候我用至于吗？不一定。这要看时候，对吗？所以在这，那两个菜，他在问两个菜，对吗？一个好吃。那怎么用至于？一道菜很好吃，至于另外

那道菜，太辣。(0.3) 对吗？
But language, little children can say so. But now you are an adult. Like when I was little, I could say dada, mama, but now I do not call my mom and dad in this way, correct not correct? Language is like this. *zhiyu* is the same. You do not have to use it. When I chat with friends, do I use *zhiyu*? Not necessary. It depends on the situation, right? So here, those two dishes, he is asking two dishes right? One is delicious, one is not delicious. Then how to use *zhiyu*? One is very delicious, as for the other one, is too spicy, right?

006 S1: 老师, "道" 什么意思?
Teacher, what does *dao* mean?

007 ((The teacher explains.))

008 S2: What is the difference between "道"and "盘"?

009 T: 一盘菜跟一碗, 一碟, 一盘。
One plate of dish, one bowl, one small dish, one plate.

010 S2: So "道" is for everything?

011 T: 对。那这个"至于"**dong bu dong**? 为什么要用"另外"? 因为有两个选择。或者三个选择。那如果有三个选择，或者很多选择, 你可以用"另外"。 你可以 说"其他的"。 至于其他的人，至于其他的同学。昨天晚上三个同学去吃饭，我们班上有二十个同学，对不对？班上有二十个同学，昨天晚上三个同学，昨天晚上三个同学去吃饭。至于其他十七 个同学，他们去看电影。不是去吃饭。在那时候我没有说"另外"，是用"其他的"，对吗？
D**ong bu dong？** (0.1). 因为你有"别的"、"其他的"、"另外"。那有时候也不用。美国人怎么样，中国人怎么样。美国人吃饭前喝汤，至于中国人-
Right. Then this 至于 do understand or not? Why do you need to use *lingwai*?
Because there are two choices. Or three choices. If there are three choices, or many choices, you do not have to use *lingwai,* you can say *qitade*. *Zhiyu…qitade,* as for other people, as for other classmates. Last night three classmates went to have dinner, there are 20 classmates in our class, right? There are 20 classmates in the class, last night there classmates went to dinner, as for the other 17 classmates, they went to watch a movie. Not going to dinner. In that situation, I did not use *lingwai*, I used *qitade*. Right? The other 17 learners. Do you understand or not? Because you have *biede, qita de, lingwai.* Sometimes you do not use them. How about Americans, how about Chinese? Americans drinks soup before eating meal, as for Chinese-.

012 S2: 吃饭后。
After meal.

013 T: 吃饭后喝汤。**Dong bu dong**? 比较清楚了吗?
Drink soup after meal. Do you understand or not? Relatively clear?

In sequence 1, the teacher explains how to use a requested grammar point in the textbook--*zhiyu…lingwai* "as for…the other" with several examples. Three tokens of *dong bu dong* were found in (011) and (013). The first *dong bu dong* appears at the beginning of (011). Before (011) the teacher is interrupted by two students in (002)(004)(006) and (008) (010) respectively. The interruption of the first student results in two long stretches of explanations regarding other grammar items rather than *zhiyu…lingwai* in (005) and (007). In contrast, the answers given by the teacher to the second student in (009) and (011) are much shorter. In fact, in (011), the teacher only gives a single word *dui* "right" before uses *dong bu dong*. Unlike most of *dong bu dong* in the data, it explicitly provides the object of *dong bu dong—zhiyu*. On the surface, it looks like a typical A-not-A question which asks the students to choose whether they understand or do not understand the grammar *zhiyu.* However, instead of pausing or giving wait time for the students to respond, she immediately moves on to explain more about *zhiyu…lingwai* and *zhiyu…qitade*. Therefore this *dong bu dong* seems more likely to signal a kind of boundary (Chen & He, 2001) and bring learners back to the intended pedagogic focus rather than serving as a comprehension check question. This also explains why the teacher particularly indicates the object of *dong bu dong* in this case. Functionally it can be considered as a discourse marker which signals "the relationship of the basic message to the foregoing discourse" (Chen & He, 2001, p. 1446).

Following this *dong bu dong*, the teacher gives a different example to explain how to use *zhiyu…qitade* "as for…the others". And this long stretch of utterances is followed by the second *dong bu dong*, which

appears in the later part of (011) as an independent TCU with 0.1 second of wait time. In fact, in the video the teacher was found looking around the class to check students' reactions and facial expressions before moving to the next topic. Therefore this second *dong bu dong* seems to function as a comprehension check question.

The third *dong bu dong* in (013) occurs at the very end of the teacher's explanation of *zhiyu…lingwai*. It is also an independent TCU. Again the teacher was found looking around and observing the reactions from the students in the video. Though the data shows no wait time provided, another comprehension check question *bijiao qing chu le ma* "(are you) relatively clear" is added right after to enforce the comprehension checking.

Sequence 2.

014 T: 现在呢, 我要你们分组。三个人一组。三个人一组，**dong bu dong**? 三个人一组。
Now, I want you to form groups. Three people per group. Three people per group.
Do you understand or not? Three people per group.

Sequence 2 occurred right after sequence 1, in which the teacher asked *dong bu dong* after giving instructions of a group activity in Chinese. After (014) students formed small groups. The teacher was asked by a student to go to his group to clarify the procedure of the group activity immediately after it. This indicates *dong bu dong* served as a comprehension check question in this case.

To sum, in teacher-fronted lecture in which the teacher addresses the whole class, *dong bu dong* can be used either as a comprehension check question, or a transaction device to bring students to the learning focus intended by the teacher. Does the teacher use *dong bu dong* with such explicit purpose in mind during her lesson? Do her students interpret the function of *dong bu dong* in the way intended by their teacher? The questions above will be discussed in the next session.

3.1.2 Interview data

3.1.2.1 Dong or bu dong

Feedback from the teacher: After watching the video clips, the teacher realized she used *dong bu dong* frequently in her lesson. Growing up in Taiwan, she had a difficult time when she moved back to the United States as a teenager because she did not understand a lot of American behaviors, though both of her parents were native English speakers and she herself was bilingual. Because of her own painful past experience, she valued comprehension by her students as the most critical thing in her teaching. Therefore asking *dong bu dong* was a way to make sure her students understood the grammar points and knew how to use them, but not each single word in her utterances.

Feedback from the students: According to the present analysis, *dong bu dong* rarely elicits verbal or nonverbal response of *budong*. In the total 20 tokens of *dong bu dong*, only two were responded with *budong* by some students either verbally or nonverbally. Does it mean the majority of students understood the lesson for majority of time? Out of 20 students, only three students claimed they would always honestly admit *bu dong* whenever they did not understand. For the remaining 17 students, they would decide what to do after checking the reactions from their classmates. The general concerns which prevent them from honestly admitting they do not understand are: 1) too embarrassed to say *bu dong* in front of the whole class; and 2) they do not want to delay the class.

As mentioned earlier, in the teacher-fronted lecture, *dong bu dong* is often found preceding a long stretch of utterances without clearly indicating the object. This leads to different interpretations by the students on what the teacher asking for in *dong bu dong*. While some students think the teacher is asking about everything she said, others think she is only asking about the critical grammar points or a subject just mentioned. These different interpretations by the students show that the range of *dong bu dong* is ambiguous when it is preceded by long utterances of the teacher. Because of the ambiguous nature, sometimes students would think *dong* even though they do not meet the pedagogical goal intended by the teacher.

3.1.2.2 Dong bu dong vs. you mei you wen ti

Besides *dong bu dong*, 21 tokens of another A-not-A comprehension check question-- *you mei you wen ti* appears in the data. It is also used overwhelmingly more frequent in the teacher-fronted lecture rather than in small group activities.

Table 2 Distribution of *you mei you wen ti.*

Activity	**Tokens of *you mei you wen ti***	**Percentage (%)**
Teacher-fronted	20	95
Small group	1	5

Feedback from the teacher: The teacher used *dong bu dong* and *you mei you wen ti* with different pedagogical goals: she chose *dong bu dong* when intending to make sure the students truly understood the grammar point. On the other hand, she used *you mei you wen ti* to invite questions from her students. Interestingly, after watching more videos, the teacher started to think in the shoes of the students. She inferred learners would ask more questions based on misunderstandings when they were asked *you mei you wen ti*; however, they might not do so if they were asked *dong bu dong*. Her reason was that the students might feel the former one invited questions, while the latter one was asked with an expectation that they have already understood the lesson.

Feedback from the students: Table 3 shows more students feel more comfortable to raise questions when they are asked *you mei you wen ti* rather than *dong bu dong*.

Table 3 Comparison of *Dong bu dong* and *you mei you wen ti* by the students in terms of which one is more comfortable to raise questions.

Dong bu dong	**You mei you wen ti**	**No differences**
4	9	7
20%	45%	35%

Students who prefer *you mei you wen ti* over *dong bu dong* generally think the latter one is just a routine question used by the teacher with an expectation of *dong* rather than *bu dong* from the students. Therefore they feel hard to say *bu dong.* One student observed that wait time usually was given after *you mei you wen ti,* but not *dong bu dong*. Another student commented that since *dong bu dong* was so frequently asked by the teacher, she had already been so used to hearing it that she just automatically nodded without thinking every time. On the other hand, *you mei you wen ti* was more open than *dong bu dong*. With *dong bu dong*, one is only given two choices: "understand" or "do not understand". If one does not understand, he/she feels the pressure of "why don't you understand?", which comes from the assumption that the teacher's expectation is *dong* not *bu dong*. Therefore it sounds more rhetorical rather than a question to some of them, while *you mei you wen ti* is more open, affective and approachable.

Only one student commented on the rude and aggressive tone of *dong bu dong,* which was mentioned earlier in this paper. This student had an unpleasant experience with it from a previous teacher when he enrolled in a summer study program in China. However, it is worth mentioning that this student interpreted *dong bu dong* used by the teacher in this study as "waiting for an open question". This example supported the claim made by Chen and He that interpreting the functions of a syntactic structure needs to take into account both grammatical and interactional information (2001).

On the other hand, four students felt more comfortable about responding to *dong bu dong,* since it seemed to ask for the most fundamental things. They felt *you mei you wen ti* to be more difficult to respond to, since they felt they had to have in mind a specific question before saying *you wen ti*.

Besides the preferences of these two comprehension check questions, a student particularly commented that a circular sitting arrangement enabled students to see their classmates' faces, providing

them with more clues of whether the rest of the class comprehended the lesson by checking each other's facial expression. She suggested that students would be more encouraged to raise questions if they found out their fellow classmates also did not understand.

3.2 Data B: Small group activity

17 out of 20 students felt it was less embarrassing to admit *bu dong* or ask questions in a small group than in front of the whole class. The following two sequences were selected from Data B which represented two different scenarios.

Sequence 3 (student A)

014 T: 我说你四门课选好了吗?
I said you have chosen four courses?

015 S: 我?
I?
T: ((Point out two fingers.))
S: ((Looked puzzled and looked at the textbook.))

016 T: 你四门课选好了吗? 我两门 (.1)
You have chosen four courses? I two
((T points out two fingers.))

017 S: 两门课?
Two courses?

018 T: <选好>了.
Have chosen.

019 S: Xue hao le.
Have chosen.

020 T: XUAN hao le ((T shows the answer on the textbook.))
Have chosen.

021 S: So 我 (0.1) 四门课?
So I four courses?

022 T: 你四门课选好了吗? (0.2)
You have chosen four course?
<我> ((T points out two fingers.)) 两门课选好了。(0.1) 两门课选好了。
I have chosen two courses.
S: ((S looks at the teacher with puzzled facial expression.))

023 T: ((T shows the answer on the textbook) <至于另外两门课>(0.2) 还没选。还没选，还没选好。 **Dong bu dong**?
As for the other two courses, not yet. Haven't chosen. Haven't chosen.
Do you understand or not?
S: ((S looks at the teacher with puzzled facial expression.))

024 T: Ok. 你有四个东西, 对吗？四门课。那因为你要用这个"至于"。
Ok. You have fours things, right? Four courses. Then because you have to use this *zhiyu*.

025 S: So, 我们, no, 我有四课-
So, we, no, I have four course.

026 T: No, 还没有。
No, not yet.

027 S: 还。
Hai

028 T: 还没有。
Not yet.

029 S: 还没有。
Not yet.

030 T: 他问你, <你四门课都选好了吗?>
He asked you, you have chosen four courses?
031 S: 我不知道。
I don't know.
032 T: <你四门课都选好了吗>? ((point out two fingers.)) 两门。
You have chosen four courses? Two courses.
033 S: 两门。
Two courses.
034 T: 选好了。<至于另外>两门课-
Have selected. As for the other two courses.
035 S: 至于另外两门课-
As for the other two courses.
036 T: 还没选。
Not chosen yet.
037 S: Hai mei xue.
Not chosen yet.
038 T: XUAN.
Choose.
039 S: XUAN. Ok.
Choose. Ok.
040 T: **Dong bu dong**?
Understand not understand?
041 S: dong。 ((with a hand gesture.))
Understand.

In sequence 3, the teacher is trying to explain how to use a grammar point *zhiyu…lingwai* with an example of selecting courses to a female student A. Compared with sequence 1, the turn taking between the teacher and A is more frequent, and each TCU of the teacher is relatively shorter. This might indicate this student feels more comfortable interacting with the teacher within a small group.

Two tokens of *dong bu dong* were found in (023) and (040). In (023), *dong bu dong* is used after several turn takings shifted back and forth between the teacher and A. The teacher intends eliciting a sentence with the grammar point *zhiyu…lingwai* from A by asking a question *ni si men ke xuan hao le ma* "have you chosen four courses" in (014). When A does not produce the desired sentence in (015), the teacher provides a further hint by pointing out two fingers. As A still tries to look for the answer from the textbook with a puzzled facial expression, the teacher repeats the same question which is immediately followed by the first half of the desired sentence *wo liang men* "I two (courses)". Then she pauses and waits for A to complete it. However, A still can not give her a satisfying answer. Therefore the teacher repeats the same question for the third time in (022) with a slightly longer pause before repeating *liang men ke xuan hao le* "I have chosen two courses". Because A shows a puzzled face again, the teacher provides the second half part of the sentence with a slower speech speed in (023). She pauses again before completing the whole sentence and repeats it for three times. Until this point, the teacher has repeated the whole example twice. Finally she uses *dong bu dong* to check whether A comprehended. Though there is no verbal response from A, the puzzled facial expression which was shown clearly on the video clip signals *bu dong* to the teacher. Therefore she repeats the same example again, followed by the second *dong bu dong* in (040). This *dong bu dong* is answered by an explicit verbal response *dong* with a hand gesture by A.

It seems the two *dong bu dong* in sequence 3 functioned effectively as comprehension check questions since they successfully elicited clear nonverbal and verbal responses from A. However, the researcher suspected student A finally said *dong* only because she was too embarrassed to ask the teacher to repeat the example one more time, as her hand gesture and facial expression seemed to the researcher "Ok, whatever. I give up".

After watching the video clip, the teacher inferred that student A might understand the theory, but not the usage (e.g., making a new sentence with *zhiyu…lingwai*). She did not further push A because she believed that A had reached her $i + 1$ level at that moment, in which i represented her current state of knowledge, while $i + 1$ is one stage higher than her current state (Krashen, 1985). The teacher made her inference based on her observation of A through the semester.

The interview of A confirmed the assumption of the teacher. A confessed that she thought she understood the teacher's explanation, but it probably would take her almost as long to come out with the same sentence.

This case shows that the more the teacher knows the student, the more accurately she/he can find out whether the student comprehends or not.

Sequence 4 (student B)

042 T: OK, 他是问四门, 对吗？两门怎么样?
OK, she is asking four courses, right? How about two courses of them?
先说两门。两门课。 (0.2) 他问你是四门。
Say about two courses first. Two courses. She is asking you four courses.
因为你要用"至于"。 "至于…另外"。
Because you need to use *as for, as for, the other.*

043 S: Oh, oh. ((S looks at his textbook. S speaks something in English.))

044 T: 他问你是四门课, 对吗? 四门课, 你可以说两门, 一门怎么样，还没选好。
She is asking you four courses, right? Four courses. You can say two courses, how about the other one? You haven't chosen yet.
((several turns with another learner who was in the same group with B.))

045 S: So 我一门课选好了, 至于另外一门课选好了。
So I have chosen one course. As for the other one I have chosen.

046 T: 还没。还没选好。
Not yet. Not chosen yet .

047 S: 还没选好。
Not chosen yet.

048 T: **Dong bu dong**?
Do you understand or not?
S: ((S nods without looking at the teacher.))

049 T: dong 了。好。
Understand. Good.

Sequence 4 follows a traditional lesson structure known as IRE/F (Mehan, 1979). In (042), the teacher initiates a question *liang men zen me yang* "how about two courses of them". Then she pauses for 0.2 seconds before repeating *ta wen ni shi si men* "she is asking you four courses". After B's turn in (043), in (044) the teacher basically repeats what she says earlier in (042). However, instead of a question form, she uses a imperative sentence *ni ke yi shuo liang men* "you can say two courses". B responds in (045) with the requested grammar point *zhiyu…lingwai*. The teacher provides a repair in (046) which repeated by B in (047). Before finally giving the evaluation *hao* 'good', she uses *dong bu dong* to confirm whether B comprehends.

Compared Sequence 3 and 4, overall the teacher speaks slightly faster with B in Sequence 4 than she does with A in Sequence 3. For instance, she does not slow down in (044) after B's turn in (043). Moreover, she produces longer turns in (042) and (044) without wait time between TCU. There is only one exception in (042). From these differences, it seems to the researcher that the teacher had a higher estimation of the comprehending ability of B than she did regarding A. On the other hand, B produces an almost perfect sentence with *zhiyu… ling wai* in (045) after the teacher's explanation in (044). Moreover, he also gives a clear nonverbal confirmation by nodding. Base on these factors, it seems to the researcher that B achieved his full comprehension.

During the interview the teacher shared the same assumption with the researcher based on the same reasons. In addition, her assumption also came from the fact that B is generally doing well in this course.

However, the feedback from B turned out to be a different story. B commented he was not paying attention and frustrated at that moment because the teacher was moving around and seemed impatient. Therefore though he did not understand, he just nodded. B claimed as *dong bu dong* has fewer syllables, he sensed the teacher wanted to end the conversation quickly and moved to the next group. Therefore he usually said *dong* toward the question *dong bu dong* even when he did not understand.

4 Conclusions

This study indicates--to a certain extent--*dong bu dong* functions effectively--especially in small group activities--as a comprehension check question. That is, it promotes further negotiation and clarification of meanings and grammars during the interaction of learners with the teacher. However, due to the gap between the assumption by the teacher and the various hindering factors among learners, *dong bu dong* may not elicit honest responses or appropriate questions when students do not understand. Therefore teachers should not over-rely on *dong bu dong* or other comprehension questions to check students' understanding of the lesson.

Of course the above conclusions are only based on the data collected from the two classes, further research needs to be done in the future with larger sample size.

5 Acknowledgement

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In defense of corpus-based methods: A behavioral profile analysis of polysemous *get* in English

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1 Introduction

Linguistics is undergoing a major change these days. There is an increasing emphasis on strengthening the methodological foundations of linguistics, which manifests itself in (i) a growing body of work refining and developing both experimental and quantitative/statistical methods, and (ii) an increasing number of studies which compare data from methodologically different sources of evidence. One relatively new field in which this discussion has been particularly lively recently is usage-based cognitive linguistics in general and cognitive semantics in particular. Early studies investigating polysemous elements – morphemes, words, syntactic constructions – advocated semantic network analysis, but such networks have been criticized for their uncertain ontological status as well as for their somewhat subjective character. More recently, cognitive semanticists have taken the usage-based commitment more seriously and have put forward semantic analysis on the basis of corpus data; cf. Gries and Stefanowitsch (2006) and Tummers, Heylen, and Geeraerts (2005) for (discussion of) representative studies. However, corpus data are not immune to critique: Raukko (1999, 2003), while skeptical of intuition-based semantic analyses, criticizes corpus-based studies of polysemy because the analyst relies on his/her linguistic introspection when analyzing and classifying the instances of a word in the texts (Raukko 1999:87); he strongly argues for an alternative experimental method, seemingly to the exclusion of other methods.

In this paper, we pursue two goals. First, we briefly characterize and then challenge Raukko's assessment of corpus-linguistic methods. Second, we apply a new method of corpus-driven semantic analysis, called *behavioral profile analysis* (cf. Divjak 2006, Divjak and Gries 2006, Gries 2006a) to Raukko's object of study, the verb *to get*. The previous studies mentioned above have shown that the behavioral profile approach can be particularly useful to resolve some problems of (especially cognitive) semantic analyses, such as the number of senses to assume and the assessment of which senses are most similar to one another. However, given the recency of this method, the number of studies that investigate highly polysemous items is still limited. We therefore apply this method to the verb *to get* to illustrate that not only does it not suffer from the problems of the intersubjective approach, but it also allows for a more bottom-up/data-driven analysis of the semantics of lexical elements to determine how many senses of a word to assume and what their similarities and differences are.

In the final section of this paper we address some more broadly applied criticisms of corpus linguistics that we feel are a result of a lack of information in the field about the nature and purpose of corpus-based research.

2 Points of critique against corpus-linguistic approaches I

This section is concerned with points of critique of a corpus-based approach from within the framework of cognitive linguistics in general and cognitive semantics in particular. We take as representative of the corpus-critical point of view those presented in Raukko (1999, 2003), in which he discusses his 1994 study on the polysemy of the English lexeme *get*. He supplied 329 high school students with a questionnaire in which subjects are asked to provide, among other things, example sentences and introspective comments on the senses of *get.* He then used what he refers to as an *intersubjective method* to determine, among other things, the number and kinds of senses of *get* and *get*'s prototypical sense. His resulting 1999 article is a discussion of the perceived advantages of his intersubjective method over other ways of investigating polysemy and of the results of the survey. The 2003 article is an attempt to show how

the results of his experiment support the notion of polysemy as a flexible mass-like entity, rather than a more traditional network of connected sense nodes.

Surprisingly, Raukko seems to have an additional purpose beyond the investigation of the polysemy of *get.* In what we take to be an effort to promote his questionnaire-based methodology to the exclusion of all others, he marginalizes other approaches by distorting aspects of corpus-based research methods. Later in this article we discuss the results of our own corpus-based study of the polysemy of *get* and compare them to Raukko's results, but before we turn to that, let us look at just two of Raukko's fundamentally mistaken generalizations about corpus-based methods as compared to his own (cf. Berez 2007 for a full critique).

2.1 Misconceptions about the goals of corpus linguistics

One of Raukko's misconceptions is his characterization of the goals of corpus linguistics:

> The linguist looks at a large and somewhat pre-processed selection of text material and tries to find the relevant instances (instantiations, specimens) of the item that s/he wants to study. (Raukko 2003:165)

This statement strikes us as either a straw man, a severe misunderstanding or just as severe a misrepresentation. It is a straw man in the sense that, sure, if a corpus linguist is investigating *get* in a corpus, she only looks for "relevant instances", i.e. instances of the verb (lemma) *get,* and not for some other item, like the noun *formaldehyde*. It is a severe misunderstanding or misrepresentation to think that a corpus linguist worthy of the name would look for instances of *get* in a corpus, but only classify as relevant those that fit her theory in order to avoid dealing with problematic counterexamples. Instead, the honorable corpus linguist reports on (a hopefully representative or randomized sample of) all instances of the form under investigation. As a matter of fact, it is a particular strength of the corpus-based approach – to which everybody who has ever been surprised by naturally-occurring linguistic data can testify – that a comprehensive corpus search typically results in data that introspection alone could not have yielded, and that all of these data are taken into account.

2.2 The role of introspection

Raukko (1999:87) likewise takes issue with the fact that corpus linguists use some degree of introspection in their analysis of corpus data:

> Other types of recent analyses of lexical polysemy […] have made use of language corpora as sources of real-life data, but here also the analyst basically relies on her/his own linguistic introspection when analyzing the instances of a word in the texts and classifying them into neat semantic categories.

Just like the previous one, this statement again is either a redundant truism or a severe misunderstanding or misrepresentation. Of course, the analysis of corpus data requires classificatory decisions which are not always entirely objective – no corpus linguist would deny this fact, just as no scientist would deny that some degree of intuition plays a role in nearly *any* study. As a matter of fact, in an amazingly self-contradictory way, Raukko's method relies more on introspection than most other supposedly empirical semantic studies we are aware of: not only does Raukko have to use his own introspection in making sense of his subjects' responses, even more curiously, Raukko's method appears to simply place a large part of the analytical burden on linguistically naïve subjects since, for instance, he simply asks his subjects for what they consider the prototypical sense (cf. Raukko 1999:91).

Thus, while we openly admit that a completely objective classification of corpus data (or most other kinds of linguistic data, for that matter) is extremely unlikely, the advantages of corpus data are that

- as mentioned above, the richness and diversity of naturally-occurring data often forces the researcher to take a broader range of facts into consideration;
- the corpus output from a particular search expression together constitute an objective database of a kind that made-up sentences or judgments often do not. More pointedly, made-up sentences or

introspective judgments involve potentially non-objective (i) data gathering, (ii) classification, and (iii) interpretive processes on the part of the researcher. Corpus data, on the other hand, at least allow for an objective and replicable data-gathering process; given replicable retrieval operation, the nature, scope, and the ideas underlying the classification of examples can be made very explicit – certainly more explicit than some coding procedures in Raukko's two studies.

In the following section, we will discuss a very brief case study of Raukko's own topic – *get* – from a recently developed corpus-based approach.

3 A case study: *get* in English

In the face of the above misrepresentations, we felt tempted to provide an outline of a recently developed corpus-based method that is immune to many of Raukko's points of critique and that has, as we will briefly mention below, received first experimental confirmations. We conducted our own study of the polysemy of *get* using a quantitative corpus method known as *behavioral profiling* (henceforth BP; see Gries and Divjak, to appear, for a summary) described below. We show that some of our results are in fact remarkably close to Raukko's, but also provide an illustration of how BPs can combine syntactic and semantic information in a multifactorial way that is hard to come by using the kinds of production experiments Raukko discusses.

While there are now several published BP studies in the domains of (near) synonymy and antonymy (cf. Divjak 2006, Divjak and Gries 2006, to appear a, b, submitted, Arppe and Järvikivi 2007, and Schmid 1993 for a slightly similar early forerunner), there is so far less work on polysemy (with the exception of Gries 2006a). Thus our study also tests the discriminatory power of the BP approach for the domain of polysemy. In the next three subsections, we discuss the general principles of the BP method, the data from our small study, and our results. At the end of Section 3, we briefly compare some of our results to those of Raukko (1999, 2003).

3.1 The BP method

As a corpus-based approach, the BP approach is based on the truism that corpus data provide (nothing but) distributional frequencies. A more relevant assumption, however, is that distributional similarity reflects, or is indicative of, functional similarity; our understanding of functional similarity is rather broad, i.e., encompassing any function of a particular expression, ranging from syntactic over semantic to discourse-pragmatic. The BP method involves the following four steps:

- the retrieval of (a representative random sample of) all instances of a word's lemma from a corpus in their context (usually at least the complete utterance/sentence);
- a (so far largely) semi-manual analysis of many properties of the use of the word forms; these properties are, following Atkins (1987), referred to as ID tags and comprise
  - morphological characteristics of the usage of the word in question: tense, aspect, mood, voice, number marking, etc.;
  - syntactic characteristics of the usage of the word in question: use in main or subordinate clauses, sentence type;
  - semantic characteristics: the sense of the word, semantic roles of the word's arguments and adjuncts;
- the generation of a co-occurrence table that specifies which ID tag level is attested how often in percent with each word (of a set of near synonyms or antonyms) or sense (of a polysemous word; the columns containing the percentages for each word or sense are then referred to as the word's or sense's behavioral profile (borrowing a narrower term coined in Hanks 1996).
- the evaluation of the table by means of descriptive techniques (such as summary frequencies), correlational methods, and/or exploratory cluster analysis.

3.2 The data

The current study is based on a dataset consisting of 600 instances of *get* in all its inflectional forms that were randomly selected from the 3,668 total instances found in the British component of the International Corpus of English, ICE-GB. Randomization was based on proportions of each inflectional form found in the full concordance. Senses were categorized manually using WordNet 2.1 and the Oxford English Dictionary Online as a rough guide to sense distinctions. Table 1 contains the 47 senses found in the data with higher-level sense groupings and examples in the right column (The classification of senses is less uncontroversial than Table 1 may suggest since it is often difficult to decide (i) whether or not to distinguish two senses and (ii) on which level of granularity to distinguish senses; the classification below is our best guess but other classifications are certainly conceivable.)

Table 1: Senses of *get* in our study

Sense / sense group	**Example**
Acquire	
concrete	Get some jellytots or something like that
metaphorical	I didn't expect to get that sort of reaction
for another	Uh let me get you a photograph
non-agentively	People get the wrong injections have the wrong leg amputated
contract illness/injury	And I said oh dear Harriet thinking oh you know she 's got the flu or something
hit/capture target	We got that one (hardened shelter in Iraq)
understand	[Y]ou got it (punchline of a joke)
Stable possession	
concrete	I've got a little sheet of paper somewhere and I've also got my diary
metaphorical	I've got a sister
have plan	I've got the department dinner on the Friday night […]
existential	There was that air of expectancy about the place you get […]
Movement in specified direction	
concrete	[…] what my emotions will be telling me when I get back home
metaphorical	He got really into Jack Kerouac so I gave him a Jack Kerouac book
cause to move	[…] they were doing all they could to get their employees out of the country
cause to metaphorically move	[…] his message is: you got them into trouble, now get them out
rise bodily	Amy cast down her napkin upon the table-cloth […] and got up
rise bodily metaphorically	would it not be easier for him to […] ask him to get off his butt and do something
rise from sleep	Getting up each morning in sub-zero temperatures […]
support metaphorically	[…] the Labour Party view would be […] to get solidly behind a UN policy
act without retribution	[I]t's worth whatever the government can get away with charging for it
cause to be sad	This is getting me down
board transportation	[…] you have to hang around HMV and then walk over or get the tube there
board transportation metaphorically	The entire mass of birds at once got on wing and flew seawards
commence action	[I]t's just a matter of getting round to it I suppose
cause to commence action	And the steel weight … was very difficult to get it turning
cause to commence action metaphorically	On Monday morning get that brain going
dispose of something	all my assorted junk […] some of it I am anxious to get rid of […]
dispose of something metaphorically	BR's policy is to get rid of the twilight atmosphere of the old stations and trains

Sense / sense group	Example
Enter state	
enter state	You must be very careful with that cos otherwise you're going to get confused
cause to enter state	And unless we can get our transport infrastructure into […] shape
become acquainted	Yes yes they're extremely friendly when you get to know them
become acquainted metaphorically	It's time I got to know the sun
form romantic couple	D' you D' you really think we could ever get back together again
rendezvous	Shall we try and get together sometime
cause to rendezvous	Trying to get a band together
establish communication	I've been trying to get in touch for months
enter into established social network	And why do they then want us to get into a political union
cause to enter into established social network	As your current certificate doesn't expire until June I will try to get you onto another refresher course before then
be friendly	I mean Father and Mother … they still don't get on very well anyhow
do in specified manner	the highest priority for the Government is to get the economy right
Complete	[W]e have got through it haven't we
Be permitted	Criminals prefer anonymity and are less likely to get to work where there is a chance of being recognized
Cope	Europe could frankly get along without us perfectly happily
Must	if you send that to him he 's got to address the issue this time certainly
Passive	
Passive	if you try to be supportive of people you so often get taken advantage of?
Cause passive	of the English creditors who [… were] still trying to get their money paid

Each data point was coded for 55 morphological, syntactic and semantic ID tags (cf. Table 2).

Table 2: ID tags used in our study

(Kind of) ID tag	Levels of ID tag
morphological	
verb form of *get*	infinitive, pres (base or 3rd), present progressive, past tense, past participle
voice of *get*	active, passive
verb form of main verb	infinitive, pres (base or 3rd), present progressive, past tense, past participle
syntactic	
transitivity of get	copula, complex trans., ditrans., intrans., monotrans., pass, prop, semi, trans.
clause function	A, AJPO, CF, CJ, CS, CT, DEFUNC, ELE, FNPPO, NOOD, NOSU, NPPO, OD, PARA, PC, PU, SU
clause type	main, depend
dep. clause type	indrel, rel, zrel, sub, zsub
transitivity of clause	copula, complex trans., ditrans., intrans., monotrans., trans.
abstractness of sense	abstract vs. concrete

26 senses occurring more than four times were analyzed quantitatively. The resulting co-occurrence table was entered into a hierarchical cluster analysis, the results of which are discussed in the following section.

3.3 Results

Even though corpus data are by definition rather noisy and the present data set is certainly not particularly large, the cluster analysis yields a dendrogram with a good deal of structure; cf. Figure 1. Moreover, several of these clusters are fairly straightforward to interpret. For example, there is

- a cluster with most possession senses (and one other): 'possess', 'possess/acquire', 'possess metaphorical' plus 'contract illness', which can be metaphorically understood as involving possession;
- a cluster with most acquisition senses: 'acquire for another', 'acquire non-agency', 'acquire', 'acquire metaphorical';
- a cluster with most movement senses (and others): 'rise bodily', 'rise from sleep', 'move in specified direction', 'move in specified direction (metaphorical)';
- a cluster containing the grammaticalized senses *must* and *passive*.

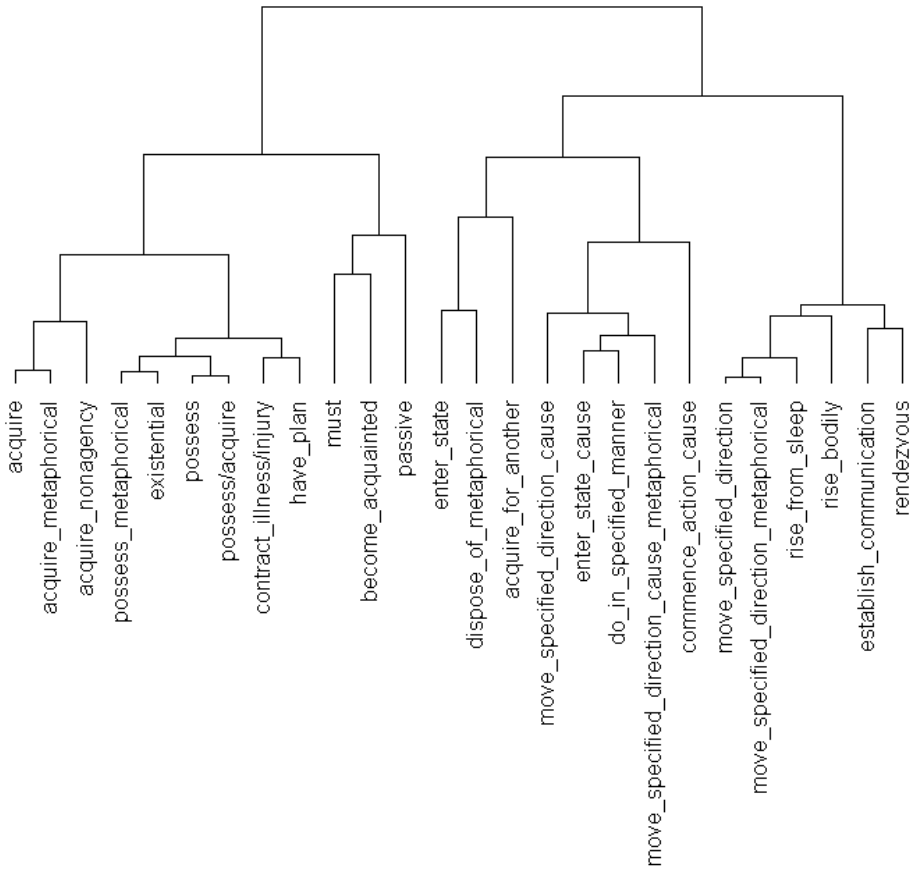

Figure 1: Result of a HAC on the BP of *to get*

In addition to this somewhat intuitive interpretation, we also ran a hierarchical agglomerative cluster analysis on the data and calculate *p*-values based on multiscale bootstrap resampling (cf. Shimodaira 2004, Suzuki and Shimodaira 2006). Again, in spite of the small sample size, we find that, as represented in Figure 2.

- the 'possess' cluster, the 'acquire' cluster, and the cluster with the grammaticalized senses reach marginal significance ($p \approx 0.07$, $p \approx 0.1$ and $p \approx 0.08$);

- the non-causative 'move' cluster reaches significance ($p \approx 0.03$ *);
- a cluster that contains all causative senses (but also two other senses; $p \approx 0.21$ ns).

It is especially interesting that these clusters emerge at least relatively clearly because it seems what underlies the clusters are semantic aspects, but the number of semantic criteria – i.e., ID tags – that were coded is in fact negligible.

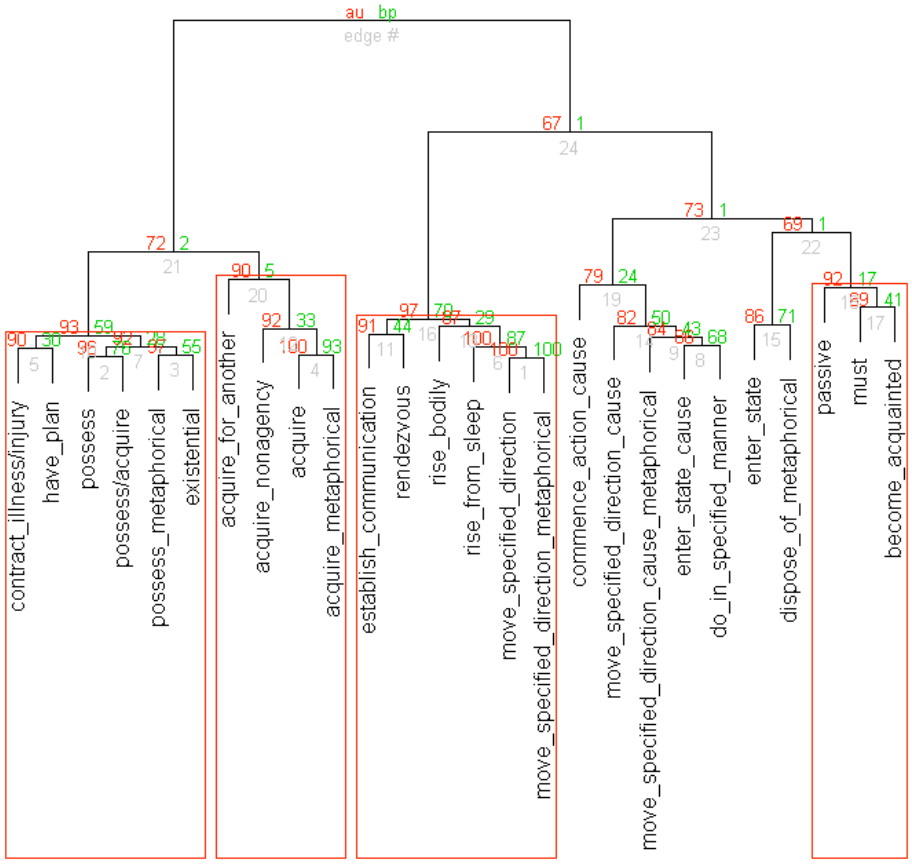

Figure 2: Result of a HAC on the BP of *to get* with multiscale bootstrap resampling

3.4 How our results compare to Raukko

So how so our results compare to those found by Raukko in his survey? He doesn't provide much in terms of descriptive statistics, but he does provide some frequency percentages for major sense categories. We can compare these frequencies with our own to make some initial observations about the relationship between introspective evidence and corpus evidence.

Table 3 shows the relative frequencies of three groups of senses. Our categorization of the senses of *get* were different from those Raukko found, but nonetheless we were able to create similar groupings.

Table 3: Comparison of occurrence frequencies

Results from Raukko (1999)		Results from corpus	
'Obtaining' + 'receiving' + 'stable possession'	43.27%	'Acquire' (all types) + 'possession' (all types)	42.00%
'Change of state'	21.15%	'Enter state' (all types)	9.83%
'Motion'	18.37%	'Move in specified direction' (all types)	16.83%

Note that two of the major categories, the 'obtain/acquire/possess' category and the 'motion/movement' category, have remarkably similar frequencies. The 'change of state' category, however, was quite different between the two studies: in Raukko, this is the third most frequently given meaning type, but it only accounted for less than ten percent of our dataset. Not included in the chart is the sense 'understand'. Raukko's informants produced examples of this sense 103 times (nearly 5% of all examples), but this sense showed up in our data only once (<1%). While we cannot make firm statements about how introspections about sense usage are borne out in actual usage based on these results (we need to consider dialect and age differences between the two populations), the data here suggest that the results of a BP approach, while coming close to the results of an experimental approach, are not the same as the latter.

4 Points of critique against corpus-linguistic approaches II

Apart from Raukko's points, there are some other concerns all too often raised with *individual* corpus-based studies, both outside of and within cognitive linguistics. These can be summarized in two frequent reactions to corpus-linguistic presentations (cf. Gries and Divjak, submitted, for more discussion):

- comments aimed at the corpus as a whole: "but isn't all this true in your corpus only?" or "I bet you would find something entirely different if you looked at a different corpus!" and "but the two corpora you are comparing are not sufficiently similar, your results are invalid!";
- comments aimed at subpart of the corpus: "I bet you would find something different if you looked at different registers!" or "I'm sure you would find something different if you looked at word forms/lemmas instead of lemmas/word forms."

In spite of their frequency, these comments are weak on two counts. First, they are procedurally problematic: The 'asker' hypothesizes a deviation from the null hypothesis (that there is no effect of or distributional difference between corpora), i.e., an alternative hypothesis, yet places the burden of proof on the 'askee'. If the asker thinks the distributional data obtained and reported on would be different in another corpus, the asker should test this alternative hypothesis instead of stipulating a difference for which (so far) no evidence exists.

Second, assertions like these are empirically problematic: The kinds of difference often hypothesized by askers is usually far from 'a given'. There is now increasing evidence that simple generalizations of what does and what does not remain constant across corpora, registers, word forms etc. are often inaccurate or exaggerated. Some of this evidence is based on BP approaches, other evidence is based on data regarding the distribution of occurrences of syntactic variables or the distribution of co-occurrences of lexico-syntactic variables.

4.1 Comments about a corpus (as a whole)

As for the comments aimed at the use of a particular corpus, for example, the results obtained by Schmid (1993), who worked with the LOB corpus, are – while less comprehensive in terms of annotation and more comprehensive in terms of sense differentiation – to a considerable degree compatible with Divjak and Gries's (to appear) results. This is noteworthy because the composition of the two corpora are of such a different nature that might compel many an audience to doubt the corpus comparability: Schmid's (1993) LOB consists exclusively of written and published texts representative for British English of the 1960s, whereas approximately 60% of the ICE-GB corpus used in Divjak and Gries (to appear) consists of spoken language and even the 40% of written language in the ICE-GB contains a sizable amount of unpublished material.

4.2 Corpus parts, registers, genres, etc.

Similar findings have been reported for the cherished distinction between spoken and written data. Stefanowitsch and Gries (to appear) and Gries (to appear) show that distinguishing between spoken and written data has no substantial effect in analyses of lexico-syntactic preferences of active vs. passive voice, the two word orders of verb-particle constructions, and the *will* vs. *going-to* future. Gries (to appear) shows that the same holds true for the ditransitive vs. prepositional dative alternation and that the 'real' division of the corpus – 'real' in the sense of explaining the maximally meaningful amount of variance in the corpus data as obtained by a principal component analysis – cuts across both spoken vs. written and all register distinctions present in the corpus. More specifically, the four corpus parts that are most homogeneous internally and most different from each other are based neither only on spoken vs. written nor only on subregisters; instead, they are mixed groups based on both these levels of granularity (cf. Gries, to appear, for details). Gries (to appear) also finds that looking at word forms does not necessarily yield results different from a lemma-based analysis.

More generally, Gries (2006b) demonstrates on the basis of three very different case studies – the frequencies of the present perfect, the predictability of particle placement, and lexicosyntactic associations of the ditransitive constructions – that the usual suspects of mode, register and even subregister account for much less variability than the above-mentioned after-presentation comments suggest. In each of the above cases, different samples from even a single corpus may yield very different results; the size of within-corpus differences is often similar in size to between-corpus differences so there is little reason to *a priori* assume that other corpora will automatically yield different results. Bottom line: the issue of corpus homogeneity and comparability can only be determined (i) empirically and (ii) individually for each phenomenon, each corpus, and each level of corpus division(s) – it cannot be determined or objected *a priori* as one sees fit.

5 Conclusion

As the field of linguistics increasingly turns to usage-based and quantitative methods, corpora can supply supporting evidence for questions answered with other methods and go beyond them in terms of both description and explanation. Here we have shown how a rejection of corpus-based investigations of polysemy is premature: our BP approach to *get* not only avoids the pitfalls Raukko mistakenly claims to be inherent in corpus research, it also provides results that are surprisingly similar to his own questionnaire-based results, and Divjak and Gries (to appear b) show how predictions following from a BP study are sdtrongly supported in two different psycholinguistic experiments. It is therefore our hope that in addressing the widely held misunderstandings that Raukko but serves to exemplify, we can encourage the use of corpus-based methods in linguistics more widely.

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From Non-Specificity to Polarity

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1 Introduction

In this paper, I discuss the consequences of the indefinite nature of Korean n-words by looking at a set of novel data. It will be shown that, contrary to what was previously thought, Korean possesses two kinds of n-words in agreement with other languages such as English, Greek, and Hungarian. One of them starts out as non-specific *amwu*, and the other as specific *nwukwu*. The non-specific *amwu* becomes a strong NPI by addition of NPI-EVEN *to*, and is licensed strictly by negation. The effect is compositionally derived by the lexical properties of NPI-EVEN (Rooth 1985; Giannakidou 2007). *Nwukwu-to*, on the other hand, is licensed in a wide variety of non-veridical contexts, and remains specific. The systematic asymmetries between the two series of n-words in Korean were captured by their specific and non-specific nature. The continuum from non-specificity to negative polarity is thus explained, and further predicted to exist as a strategy in other languages.

First, surprising contrasts in polarity between the two n-word series will be discussed in section 2. Based on the licenser asymmetries, I will argue that *amwu-to* is a strong negative polarity item (NPI) that can be licensed only by overt-negation, following Lee, Chung & Nam (2002). In contrast, *nwukwu-to* is an affective polarity item (API) that is licensed also by non-negative environments such as comparatives, modals, imperatives, and conditionals. The distinct polarity is further supported by asymmetries in a linear order constraint, a locality constraint, and various morphological facts that will be discussed later.

On the other hand, their asymmetry in specificity will be argued in section 3. (Non-)Specificity is manifested by their distinct interpretations with respect to the scope of an intensional operator, and by their modification by subjunctive relative clauses (à la Farkas 1985; Giannakidou 1997). Furthermore, modification by the specificity marker *paro ku* (*this* in the noteworthiness sense of Ionin 2006) and *tukcenghan* (*a certain*) lends support to the proposed specificity asymmetry.

Given the two distinct paradigms of polarity and specificity, I will propose a compositional account that the non-specific *amwu* becomes a strong NPI by addition of NPI-EVEN *to*, and is licensed strictly by negation. The effect is compositionally derived by the lexical properties of NPI-EVEN (Giannakidou 2007). *Nwukwu*, on the other hand, is licensed in a wide variety of non-veridical contexts, and remains specific. This will be discussed in section 4.

2 Asymmetry in Polarity

2.1 Asymmetry in Licensers

In this section, I claim that the two n-word series reveal a significant split in polarity. The distinct polarity will be shown in the strong negative indefinite *amwu-to* (arbitrary choice+even: *anyone*) and the (weak) affective indefintie *nwukwu-to* (who+even: *anyone*). The following table 1 summarizes the distributions of *amwu-to* and *nwukwu-to* in terms of the veridicality of their licensing environments (Zwarts 1995; Giannakidou 1997a). Given the distributional facts, Lee et al (2002) analyzes *amwu-to* as a strong negative polarity item which requires an anti-veridical operator (i.e. overt negation). However, the distributions of *nwukwu-to* comprising non-veridical contexts as well as anti-veridical ones compel us to characterize *nwukwuto* as an API, unlike the NPI *amwu-to*.

Table 1. negative indefinites licensing by veridicality operator

Licensing Operator	*amwu-to* (Lee et al 2000)	***nwukwu-to* (current claim)**
Veridical (p → q)	*	*
Non-veridical (p-/-> q)	*	√
A(nti)-veridical(p→ ¬q)	√	√

2.2 Asymmetry in Linear Order

The polarity asymmetry is further supported by a linear order asymmetry between *amwu-to* and *nwukwu-to*. Sells (2006) observes that only a stronger NPI can precede a weaker NPI in Korean but not vice versa, and suggests strong>weak NPI order restrictions in Korean (contra Kuno and Whitman's (2004) prediction). As shown in (1), a stronger NPI *amwuto* (anyone) can precede a weaker NPI *han phwun-to* (even one cent) (1a) but the reverse order (1b) sounds unnatural.

(1) a. amwu-to	han phwun-to	nay-ci	anh-ess-ta.		[KKN]
anyone	one cent-even	give-COMP	Neg-Pst-Decl		
'Noone gave even one cent.'					
b.??han salam-to	amwu kes-to	nay-ci	anh-ess-ta.		
one person-even	anything	give-COMP	Neg-Pst-Decl		
'Not one person gave anything.'				(Sells 2006)	

This linear order constraint on Korean NPIs lends further support for the current claim that *amwu-to* is stronger in negative polairty than *nwukwu-to*, because the following data show that the strong NPI *amwu-to* can precede the API *nwukwu-to* in (2a) but the opposite order triggers ungrammaticality in (2b).

(2) a.Na-nun	**amwu-**eykey**-to**	**nwukwu-to**	poyecwu-ci	an-ess-ta. (NPI>API)	[KKN]
I-TOP	anyone-DAT-TO	anyone-TO	show-COMP	NEG-PST-DECL	
b.*Na-nun	**nwukwu-**eykey**-to**	**amwu-to**	poyecwu-ci	an-ess-ta.(*API>NPI)	
I-TOP	anyone- DAT-TO	anyone-TO	show-COMP	NEG-PST-DECL	
'I didn't introduce anyone to anyone.'					

2.3 Asymmetry in Prosodic Emphasis

Prosodic emphasis is a well-known strategy for marking n-words as in Greek where an NPI *KANENAS* is derived from an API *kanenas* (anyone) via an emphatic device (Giannakidou 1999), and similar effects are observed in Japanese between an emphatic NPI *DAREMO* and a non-emphatic API *daremo* (anyone) (Kawashima 1994).

In the same vein, I claim that Korean API *nwukwu*-series can get an emphatic stress to mark its negative polarity property, in which case its distribution becomes more constrained in accordance with what has been observed in other languages. However, a strong NPI *amwu*-series optionally gets such prosodic emphasis, because it is lexically marked as a strong NPI already without the prosodic aid. Therefore, *nwukwuto* diverges into two types of NPIs with respect to the prosodic marking, while *amwuto* remains a strong NPI irrespective of the emphasis.

2.4 Asymmetry in Morphology

Haspelmath's (1993) crosslinguistic study of indefinites shows that NPIs with an ambiguous particle between additive and concessive are frequently observed. Although the meaning of Korean indefinite particle *to* is ambiguous between additive *also* and concessive *even* as in many other languages (e.g. Japanese *mo*), the purely additive import is unavailable with *amwu-to* in (3) as opposed to *nwukwu-to* in (4).

(3) amwu-**to**	an	o-ess-ta.	[KKN]
anyone-**EVEN**	NEG	come-PST-DECL	
'Not even anyone came' (Noone came)			

(4) nwukwu-**to** an o-ess-ta.
anyone-**EVEN/ALSO** NEG come-PST-DECL
i) EVEN-reading: *'Not even anyone came' (Noone came)*
ii) ALSO-reading: *'There is also someone who didn't come'*

Thus far, it has been shown that Korean adopts two distinct negative indefinite series with weak and strong negative polarity as in English (noone-anyone), Greek, and Hungarian. The proposed polarity asymmetry between *awmu-* and *nwukwu*-series has been supported by empirical facts from various aspects: systematic asymmetries were observed in the distributional facts, the linear order constraints, the prosodic effects, and the morphological ambiguity.

3 Asymmetry in Indefinites

3.1 Asymmetry in Scope Interactions

Although specificity has been defined by various assumptions (speaker's having an individual in mind by Hellan 1981 & Ioup 1977; referentiality by Donellan 1966 & Partee 1972; de dicto-de re reading by Saarinen 1981), the prevalent view is that s specific NP has wide scope over certain operators (Fodor and Sag 1982; Enç 1991). Thus, scope relations will be discussed between two types of indefinites (*awmu-* and *nwukwu*-series) and several operators to diagnose the (non-)specificity.

As illustrated below, *amwu* is adopted to indicate non-specificity and John's indifference, and therefore is interpreted as 'John wants to get married to any Korean girl as long as she is Korean' in (5a). However, (6a) is only semantically legitimate when there is a particular girl that the speaker refers to. This specificity asymmetry can be accounted for by their scoping asymmetry that *amwu*-series is interpreted inside the scope of intensional operator 'want' in (5b) while *nwukwu*-series takes scope outside the intensional operator in (6b).

(5) a. con-un hankwuk-yeca **amwu**-wa kyelhonha-ko sipehan-ta. [KKN]
John-TOP Korean girl anyone-with marry-COMP want-DECL
Non-speicific: *'John wants to get married to any Korean girl…because he is Korean himself, and he wants his children to acquire his ancestors' language'*
b. **[WANT ∃ w ∃ x Korean-girl(x,w) ∧ marry (x at w)]**

(6) a. con-nun hankwukyeca **nwukwu-**wa kyelhonha-ko sipehan-ta.
John-TOP Korean girl someone-with marry-COMP want-DECL
Specific: *'he wants to get married to a Korean girl … he fell in love with her during his visit to Seoul'*
b. **[∃ x in w_0 WANT (marry (x at w))]**

In Fodor and Sag's (1982) example (7), the relative scope of the NP *every woman* and *a child in fifth grade* causes ambiguity: *every woman* takes wide scope and *a child in fifth grade* is interpreted as a non-specific individual in (45a), while *every woman* takes narrow scope and *a child in fifth grade* becomes a specific child that the speaker refers to in (8b).

(7) Every woman talked to a child in fifth grade.(Fodor and Sag 1982; Enç 1991)

(8) a. For every woman there is some child or other in fifth grade, such that the woman talked to the child. **(Non-speicific: ∀ > ∃)**
b. There is a child in fifth grade such that every woman talked to him. **(Specific: ∃ > ∀)**

Although the NP followed by a weak quantifier *a* in English shows ambiguous scope behaviors, the scope relations in the sentences with the *awmu*-series and *nwukwu*-series indefinite are never ambiguous. As illustrated below, the *nwukwu*-series only takes wide scope marking its specificity in (9). In contrast with this, the *awmu*-series is uninterpretable in a specific wide scope sense in (10).

(9) motun yecatul-i ohaknyen-haksayng **nwukwu**-wa yeikihay-ss-ta. [KKN]
every woman-NOM fifth grade-student someone-with talk-PST-DECL
'Every woman talked to a child in fifth grade.'
Non-speicific: *∀ > ∃
Specific: ∃ > ∀

(10) motun yecatul-i ohaknyen-haksayng **amwu**-wa yeikihay-ss-ta
every woman-NOM fifth grade-student someone-with talk-PST-DECL

'Every woman talked to a child in fifth grade.'
Non-speicific: ∀ > ∃
Specific: * ∃ > ∀

3.2 Asymmetry in Modification by Specificity Markers

Following Maclaran (1982), Ionin (2006) discusses the referential *this* in English as a specificity marker, claiming that *this* encodes a semantic feature as noteworthiness in terms of Fodor and Sag's (1982) referentiality. Maclaran characterizes the use of referential *this* as "draws attention to the fact that the speaker has a particular referent in mind, about which further information may be given" as shown in (11).

(11) a. He put on √**a/#this** 31 cent stamp on the envelope, so he must want it to go airmail.
b. He put on √**a/√this** 31 cent stamp on the envelope, and only realized later that it was worth a fortune because it was unperforated.

In Korean, *paro ku* (referential 'this') seems to play a similar role as noteworthiness *this* in Ionin's sense when followed by an indefinite. Observe below that the *amwu*-series existential indefinite *amwu-kay* (Mr. so-and-so; someone) cannot be modified by a specificity marker *paro ku* (noteworthiness 'this') while the *nwukwu*-series *nwukwu-nka* (someone) can in (12).

(12) Context: John has been trying to set me up with someone who is tall, dark and handsome according to John's claim. I am very excited because:

a.#onulpam	**paro ku**	**amwukay-wa**	manna-lke-ya.	[KKN]
tonight	**this**	**someone-with**	meet-FUT-DECL	
b. onulpam	**paro ku**	**nwukwunka-wa**	manna-lke-ya.	
tonight	**this**	**someone-with**	meet-FUT-DECL	

'I am going to meet with this someone tonight (, whom I might be spending the rest of my life with)!'

Given that the modification by referential *this* can be a specificity test, I argue that above asymmetry also serves evidence that the *amwu*-series is a non-specific indefinite whereas the *nwukwu*-series is a specific indefinite. As noted by Hintikka (1986), a modification by adjectives such as *a certain*, *specific*, and *particular* directly indicates the specificity of a modified NP in English

(13) Every true Englishman adores **a certain** woman.

(14) (∃ *f*) (∀ *y*) (*y* is a true Englishman → *y* adores f(*y*))

Accordingly, the asymmetric modifiability between the *nwukwu*-series (15a) and the *amwu*-series indefinite (15b) seems to stem from the difference in terms of the proposed specificity split.

(15) a. cenchika-nun	**tukcenghan**	**nwukwu-**lul	senhohaci-an-a.	[KKN]
politician-TOP	a certain	WH-ACC	prefer-NEG-DECL	
b.#cenchika-nun	**tukcenghan**	**amwu**-lul	senhohaci-an-a.	
politician-TOP	a certain	AWMU-ACC	prefer-NEG-DECL	

'As for politicians, I do not prefer a specific one.'
c. (∃ *f*) (∀ *y*) (*y* is a politician → I do not prefer f(*y*))

3.3 Asymmetry in Pragmatic Effects

In preceding sections, two types of indefinites have been tested to prove their asymmetric nature in terms of (non-)specificity. As a final confirmation, pragmatic effects driven from the specificity property will be discussed in this section. Haspelmath (1997) states "as an example of semantic enrichment based on conversational implicatures, a secondary qualitative meaning of indefinites has been frequently noted: crosslinguistic evidence shows that indefinite pronouns can have two types of semantic enrichment: appreciative ('someone important', 'something remarkable') and depreciative ('an unimportant person', 'in

a negligent manner') (Stoffel 1899)". The following crosslinguistic data taken from Haspelmath illustrate the effects.

(16) *Appreciative Indefinites in Languages*
German *wer*, French *quelqu'un*, Polish *czym-ś*, English *some* (Quirk et al. 1985), Latin *ali-que* (Seneca, Dial.), Basque *nor-bait* (Aulestia 1989), Hungarian *vala-ki*

(17) *Depreciative Indefinites in Languages*
Russian *kak-nibud'*, Lithuanian *bet kaip/kaip nors*, Spanish *cualquieras* (Lombard 1938), Basque *edo-nola* (Aulestia 1989), Yakut *xannyk eme* (Ubrjatova 1982), English *anyhow* (Stoffel 1899)

Haspelmath argues that the commonality in appreciative items is that they all have a 'specific' function while depreciative items have a 'non-specific' function. Observing the correlation between specific functions and appreciative interpretations, and between non-specific functions and depreciative interpretations, Haspelmath puts "given that all people are choosy, it is normal that hearers should expect the worst if they are told that the referent has been selected randomly".

Given this, the distinct pragmatic effects triggered by two Korean indefinites seem to be connected to the specificity difference. Now the appreciative flavor of *nwukwu*-series in (18) is predicted by the previously argued specificity function: the indefinite *nwukwuna* is used in a positive sense such that there is a teacher that everyone follows and the speaker's positive attitude toward the situation is revealed by the *nwukwu*-series indefinite because the teacher is respectable and deserves to be worshiped. On the other hand, non-specific *amwu*-series has a tendency to mark depreciative nuance as shown in (19) where 'a puppy that will obey to anyone if the person has a piece of meat' and the negative feeling of the speaker about the situation is expressed by selecting the non-specific indefinite *amwuna* (Free Choice 'anyone'). If the *amwuna* is replaced by a specific indefinite *nwukwuna* (Free Choice 'anyone') in (19), then the speaker would not be the owner of the puppy and must have a positive attitude or at least neutral attitude to the puppy's sociable character.

(18) *Appreciative Use*
nwukwu-na ttarunun susung [KKN]
anyone-FC following teacher
'a teacher that everyone follows (because the teacher is very respectable)'

(19) *Depreciative Use*
amwu-na ttarunun kangaci
anyone-FC following puppy
'a puppy that follows anyone (if the person has any food)'

Therefore, Haspelmath's connectivity between specificity and pragmatic effects lends further support to the current claim on specificity asymmetry between *nwukwu*-series and *amwu*-series indefinite in Korean. In a similar respect, the speaker's ignorance or indifference observed only in *amwu*-series free choice items (Choi 2005) can be reduced to the non-specificity property[1].

4 Morphological Composition

4.1 EVEN with NPI-force

I propose a morphological account that capitalizes on the specificity asymmetries of the two series of polarity items. I argue that *amwu* is an inherently non-specific indefinite, whereas *nwukwu* is a specific indefinite. NPI-*amwuto* results from the addition of NPI-*even* to a non-specific indefinite. According to Rooth 1985 and Giannakidou 2007, NPI-*even* associates with the most likely alternative (20). As

[1] To account for the semantic asymmetry between two types of Free Choice items, Choi (2005) argues that the *amwu*-based items (e.g. *amwu-lato/na*) induce domain-widening effects (in the sense of Davison 1980; Kadmon and Landman 1993). Although the semantic effects of *amwu*-items can be in part captured by it, I will not assume the domain-widening property for *amwu*-indefinites for the limitations appointed by Krifka (1995) and Giannakidou (2008).

association with the highest element enables the combination of *one* with negation (*hana-to an 'not even one'*), I assume a lexical entry for *to* that is similar to Greek NPI-EVEN *oute*.

(20) [[**NOT to** (x) (P)]] = 1 iff $\neg$ P (x) = 1; (assertion)
$\exists$ y [y $\neq$ x $\wedge$ C(y) $\wedge$ $\neg$ P(y)] $\wedge$
$\forall$ y [y $\neq$ x$\rightarrow$likelihood (P(x)) > likelihood (P(y))] (presupposition)

Furthermore, as the association with the highest element enables the combination of *one* with negation (*hana-to an 'not even one'*) in Korean as well as in Greek, I assume a lexical entry for *to* that is similar to Greek NPI-EVEN *oute* when combined with a minimum quantity.

(21) [[to]] = λ xλ P: $\exists$ y[y$\neq$x $\wedge$ C(y) $\wedge$ $\neg$P(y)] $\wedge$ $\forall$ y[y$\neq$x (likelihood P(x) > likelihood(P(y))]. P(x)

Given these facts, I propose that the NPI-EVEN particle *to*, when attached to an indefinite, bears a negative polarity force derived from a morphologically triggered likelihood scale.

4.2 Indefinite with NPI-force

The close connectivity between non-specificity and non-veridicality is not new. It has been noted that non-veridicality is associated with non-specificity (Paduceva 1985; Giannakidou 1998). Furthermore, the link between non-specificity and non-veridicality is discussed by Givón (1994:207,322) and Croft (1983 for Russian *–nibud'* items) in terms of habituality, as D.Levinson (2006) rephrases "allowing the non-specific (non-referential) interpretation of noun phrases is a property that the habitual shares with nonveridical environments. In the affirmative sentence (22), the NP must be referential. In (23), with the habitual meaning, the non-referential interpretation of the NP is available, and in fact, preferred."

(22) He bought a new car.

(23) He buys a new car every year.

Besides habitual environments, the correlations from specificity (i.e. referentiality) to veridicality and from non-specificity to non-veridicality are evidenced from various aspects. First, recall that modification by a subjunctive mood clause is a diagnostic for a non-specific indefinite (Farkas 1985; Giannakidou 1997). Taking into account the fact that a *subjunctive mood* clause is a non-veridical environment as shown in the characterization of non-veridicality (24), we are given the link from non-specificity to non-veridicality via the shared availability of subjunctive mood. More remarkably, crosslinguistic data reveal that complements with subjunctive mood license NPIs while ones with indicative mood do not (Haspelmath 1997; Pereltsvaig 2000; Quer 1998; Giannakidou 2008). Thus, the proposed connection seems to be robust.

(24) Non-veridicality characterizes the meaning of functions that do not ensure truth, e.g. negation, disjunction, volitional verbs *want, suggest, insist,* modal verbs and adverbials, imperatives, questions, habituals, and the subjunctive."

Second, as the non-specificity of an indefinite indicates the property of not being forced to refer to any discourse referent, it is connected to a *non-existence* property. In a similar vein, Progovac (2000) claims that *some* indefinites in English are specific/referential. Giannakidou (2008) further develops Progovac's argument such that emphatic *SOME* indefinites always assert an existence in some model and never take narrower scope than negation as illustrated in (25). She argues "if what underlies polarity indefinite is an inability to refer to individuals in a default context, the relevance of notion such as non-existence (Lin 1996) is not accidental. (Non)existence and (non)veridicality is tightly connected: in a veridical context you are forced to refer, thus exist; in a nonveridical one, you are not."

(25) a. John didn't call SOMEONE # not > some
b. Nobody called SOMEONE # no one > some
c. John came to the party without SOMEONE. # without > some

Furthermore, a *non-individuation* property reveals the connection from non-specificity to non-veridicality along the lines of the non-existence property. That is, as Tovena and Jayez (2005) argue that polarity indefinites (i.e. non-veridical) are unable to refer to an individual, non-specific indefinites are also unable to refer to an individual. The crucial link is thus predicted in terms of the inability to refer to an individual.

Finally, the most fundamental correlation is inferred from *scope interaction* facts. Recall from section 3 that non-specific indefinites always take narrow scope than the operators such as intensional verbs, universal quantifiers, negation, or modals that we discussed in section 3.1. Now consider that NPIs must take narrow scope than their licensers and be interpreted therein. These scope constraints naturally predict that a specific indefinite is inherently unable to be realized as an NPI for the obvious scope requirement conflicts.

Thus far, the inherent connection between non-specificity and non-veridicality has been discussed in terms of habituality, subjunctive mood, non-existence, non-individuation, and scope interactions. If we turn back to the discussion of Korean indefinite *amwu-* and *nwukwu*-series, only the non-specific indefinite *amwu* is predicted to have these properties that are shared with non-veridicality.

In the previous literature, some properties pertaining to the non-specific indefinite *amwu* has been argued as typical characteristics of free choice items (FCIs) or NPIs under different terms such as domain widening by Kadman and Landman (1993 for English *any*) and Kratzer and Shimoyama (2002 for German *irgendein*), speaker indifference (von Fintel 2000; Horn 2000; Giannakidou 2001), domain vagueness (Dayal 1995), and non-individuation (Tovena and Jayez 2005). However, as I have argued above, these properties are equally reducible to the non-specificity of a given indefinite. Thus, I propose that the arbitrary choice force (as in Lee et al's (2000) term) of *amwu* comes from its non-specificity property based on aforementioned arguments. It seems that to some extent non-specific *amwu* behaves like English (emphatic) *any* whereas specific *nwukwu* is similar to (emphatic) *some* (in the sense of Progovac 2000 and Giannakidou 2008) in terms of specificity.

On the other hand, the non-existence property of *amwu* is reminiscent of the 'dependent existential' (*ku…a* and *kwelh…a* in St'at'imcets Salish) which Matthewson (1998:179) defines as "this peculiar existential that cannot assert existence in a default context." Putting more emphasis on the parallel between such St'at'imcets Salish determiners and Greek *kanenas*, Giannakidou (1998: 70, 139) defines dependent indefinites as the following:

(26) An existential quantifier $\exists x_d$ is dependent iff the variable x_d it contributes does not introduce a discourse referent in the main context.
Within her system, the deficiency of dependent existential comes from the fact that they cannot be valued by the assignment function *g* in a main context.

(27) *Dependent variables*
A variable x_d is dependent iff x_d cannot be interpreted as a free variable.

Giannakidou (2008) further argues that since a dependent variable is not able to link to a discourse referent, one of the following three options will rescue such a variable: (a) binding by a higher quantifier; (b) embedding under negation and nonveridical operators; (c) co-reference. More crucially, dependent indefinites with non-deictic variables are always non-specific and have narrow scope. Therefore, referential dependency is directly linked to specificity. That is, Korean non-specific indefinite *amwu* is a dependent indefinite because it does not assert existence, whereas the specific indefinite *nwukwu* introduces a discourse referent in an actual world or speaker's epistemic model. Consequently, while the dependent indefinite *amwuto* requires to be rescued by one of above three means (a)-(c), the non-dependent indefinite *nwukwuto* is viable without such a rescue. *Nwukwuto* (who/someone-even/also) is interpreted as 'someone also' in a positive sentence when it fails to be rescued by any of the three options. Or, *nwukwuto* becomes an NPI, being interpreted as 'even anyone', when rescued by (b) negation. Therefore, the polarity source of two indefinites is defined in terms of non-veridicality driven from referential dependency.

5 Conclusion

In this study, systematic asymmetries between the two series of NPI indefinites in Korean were captured by their specific and non-specific nature. The strict NPI nature of one of them (*amwu-to*) was

compositionally derived from the fact that a non-specific item combines with NPI-EVEN *to*. Specific indefinite *nwukwu-to*, on the other hand, remains a broader NPI, even after combined with NPI-EVEN. The continuum from non-specificity to negative polarity is thus explained, and further predicted to exist as a strategy in other languages.

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